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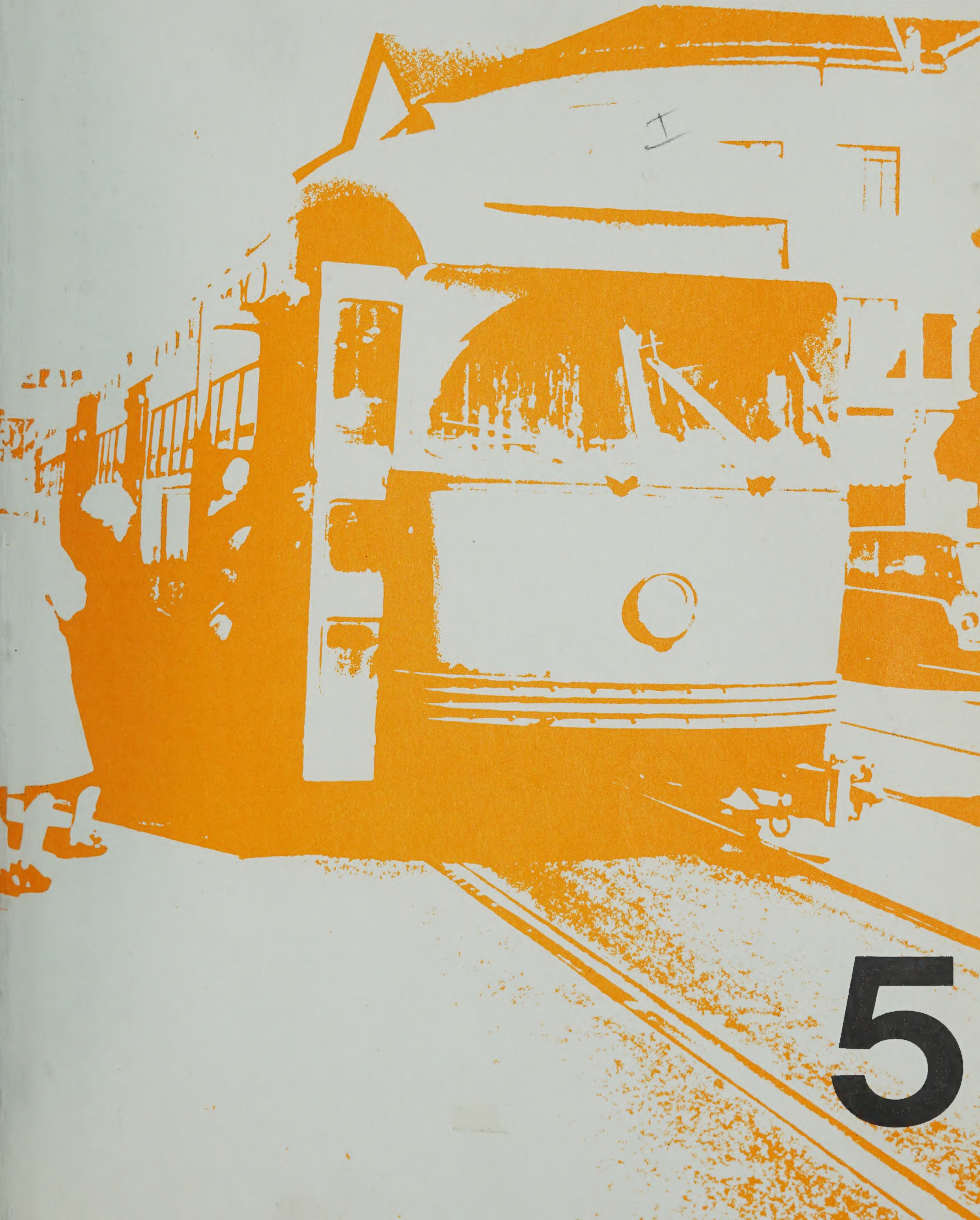

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## 5.0 PROBABLE IMPACTS OF PROJECT ALTERNATIVES

In analyzing the impact of this project certain definitions should be remembered when reading this report:

- "Impact" is considered to be any change to existing or future surroundings which would not have occurred without the project's being built. Under this definition the No-Build Alternative may be said to have a neutral impact; that is, present area trends and conditions will follow their natural courses. For this reason, the No-Build Alternative is used as a basis of comparison for the effects of the other alternatives.

- This report attempts to cover the beneficial as well as the negative impacts expected from the project. Where the two are due to the same action, both are covered under their respective headings.

- Impacts, as shown for each alternative, are the final result after all practical measures have been taken to minimize them.

## 5.1 Transportation Impacts

### 5.1.1 Rapid/Transit Ridership

Patronage estimates were prepared by the Central Transportation Planning Staff for the forecast years 1980 and 1995 for the relocated Orange Line from Forest Hills to Back Bay Station. For the purposes of these forecasts it was assumed that an arterial street would be built concurrently between Forest Hills and Ruggles Street since this would produce the most conservative estimate of transit ridership. A conventional computerized transportation planning modelling process calibrated to the Eastern Massachusetts Region has been used to produce ridership estimates for a No-Build alternative and for the relocated alternatives. The ridership estimates developed in this section relate to the several alternatives on the railroad right-of-way. The ridership estimates would be the same for all Relocated alternatives with the same location alignment even though the rail elevation would change depending on the alternative. This stability in ridership would occur because the number of station locations would remain unchanged.

#### Rapid/Transit Demand and Ridership

Using the results of the ridership demand modelling process, the total daily demand for rapid/transit boardings at the seven planned stations between Forest Hills and Massachusetts Avenue has been estimated to be 42,700 boardings in 1980 and 43,300 boardings in 1995. By including Back Bay and South Cove stations, the estimated inbound daily boardings in 1980 would be over 56,000 and more than 57,100 in 1995. These ridership demands are unconstrained by parking capacities at the stations. When parking constraints are applied at the Forest Hills station there is a reduction in ridership of 1236 boardings per day in 1980.

In the No-Build alternative, the total daily demand for rapid-transit boardings on the existing Orange Line has been estimated to be 33,300 boardings in 1980 and 34,000 boardings in 1995. These estimates are also unconstrained by parking capacities at these stations. This means that there would be a net increase in ridership of 9,400 in 1980 and 9,300 in 1995 between the No-Build and the Relocated Orange Line alternatives for the seven stations on each line (those compared for the relocated Orange Line are south of Massachusetts Avenue). By including Back Bay and South Cove stations the increases on the Relocated alignment would be 22,700 in 1980 and 23,200 in 1995.

These demand-ridership figures include intracorridor ("local") trips as well as "through" trips to Boston proper. However, the vast majority of the transit riders are making through trips rather than local ones.

Distribution of Ridership Among Stations

The ridership increases from 33,300 (1980) for the five stations in the No-Build alternative to 43,300 (1995) for the seven stations in the Relocated alternative. The majority of these new riders are picked up by the new stations at Boylston Street, Jackson Square and Ruggles Street. The ridership at the Forest Hills and the Green Street Stations increases only slightly. Thus, in 1995, there would be a net increase of 10,000 riders from the No-Build (1980) to the Relocated alternative (1995) at the stations south of Massachusetts Avenue and an increase of 23,000 riders when the Back Bay and South Cove stations are included.

Origins of Transit Ridership

There is a substantial difference in the ridership characteristics between the No-Build and Relocated alternatives. The Roxbury, Parker Hill/Fenway, and Jamaica Plain areas show substantial increases in ridership (see Fig. V-1) because the relocated Orange Line would be more centrally located with respect to densely developed areas of these same communities than the existing location. Smaller increases are shown for Roslindale, West Roxbury and Hyde Park. Increases in ridership between the No-Build and Relocated alternatives are negligible in most of the other communities in the Southwest Corridor. A town-by-town comparison of 24-hour boardings (1980) at each station for the two alternatives appears in Fig. V-1. The estimated boardings at each station for the two alternatives appears in Fig. V-2.

Mode of Station Access

A comparison of the 1980 No-Build and Relocated alternatives indicates an increase of about 2,600 transit riders during the 7 to 10 AM peak period for the stations between Forest Hills and Massachusetts Avenue and nearly 4,800 transit riders when Back Bay and South Cove stations are included. Minor differences are indicated in the kiss-and-ride and park-and-ride access modes. The most significant difference would occur in the feeder bus system where an increase of nearly 2,700 passengers would be expected during the 7 to 10 AM peak period. When the Back Bay and South Cove stations are included, over 3,500 passengers would be expected to be served by feeder bus and by railroad transfers at Back Bay station.

At other hours of the day, substantial increases in the "walk" category would be expected because of the close proximity between major transit generators such as the Back Bay commercial district, Northeastern University, Mission Hill, Whittier Street and Bromley/Heath Housing Projects, Campus High School, the proposed Roxbury Community College, the proposed Jamaica Plain II High School, and other potential development in the immediate vicinity of the proposed new transit stations.

The Forest Hills station is the only station to have a large number of park-riders in all alternatives, since it is the terminal station on the Orange Line. These park-riders come from all parts of the Southwest Corridor. It may be noted that most of the park-riders using the Forest Hills station come from communities which are farther removed from the station than either kiss-riders or transit users going across to the Forest Hills Station by bus.

(FIG. V-1)
ESTIMATED DAILY RIDERSHIP DEMAND DISTRIBUTION
BY COMMUNITY

(Inbound Boardings-24 hours)

| Community | 1980 No-Build | 1980 Relocated | 1995 No-Build | 1995 Relocated |
|---|---|---|---|---|
| Boston Proper | 3,480 | 1,550 | 3,590 | 1,600 |
| Brookline | 288 | 310 | 300 | 324 |
| Canton | 65 | 72 | 83 | 92 |
| Dedham | 922 | 922 | 966 | 1,072 |
| Dorchester | 2,472 | 2,427 | 2,422 | 2,380 |
| Dover | 102 | 113 | 122 | 133 |
| Hyde Park | 2,090 | 2,200 | 2,257 | 2,376 |
| Jamaica Plain | 5,531 | 8,530 | 5,425 | 8,373 |
| Medfield | 96 | 97 | 119 | 120 |
| Milton | 82 | 85 | 87 | 90 |
| Needham | 178 | 195 | 194 | 213 |
| Newton | 26 | 27 | 27 | 28 |
| Norwood | 492 | 497 | 550 | 557 |
| Parker Hill/Fenway | 296 | 3,890 | 299 | 3,940 |
| Roslindale | 3,458 | 3,802 | 3,804 | 3,183 |
| Roxbury | 9,520 | 13,966 | 9,140 | 13,408 |
| Sherborn | 19 | 20 | 31 | 32 |
| South Boston | 1,044 | 600 | 990 | 570 |
| Walpole | 90 | 96 | 115 | 123 |
| West Roxbury | 2,297 | 2,430 | 2,481 | 2,640 |
| Westwood | 591 | 630 | 739 | 790 |
| Other | 181 | 186 | 214 | 221 |
| Total | 33,320 | 42,715 | 33,985 | 43,265 |

(FIG. V-2)
ESTIMATED DAILY BOARDINGS AT ORANGE LINE STATIONS

(Inbound Boardings - 24 hours)

| Station | 1980 No-Build | 1980 Relocated | 1995 No-Build | 1995 Relocated |
|---|---|---|---|---|
| Forest Hills | 13,760 | 14,585 | 14,850 | 15,780 |
| Green Street | 1,860 | 2,330 | 1,825 | 2,285 |
| Boylston Street | --- | 2,110 | --- | 2,070 |
| Egleston | 3,660 | --- | 3,555 | --- |
| Jackson Square | --- | 6,580 | --- | 6,380 |
| Dudley | 8,390 | --- | 8,090 | --- |
| Roxbury Crossing | --- | 5,330 | --- | 5,190 |
| Ruggles Street | --- | 8,130 | --- | 7,930 |
| Northampton/Mass. Ave. | 3,450 | 3,650 | 3,395 | 3,630 |
| Dover | 2,200 | --- | 2,270 | --- |
| Sub Total | 33,320 | 42,715 | 33,985 | 43,265 |
| Back Bay | --- | 8,715 | --- | 9,150 |
| South Cove | --- | 4,585 | --- | 4,725 |
| Total | 33,320 | 56,015 | 33,985 | 57,140 |

### 5.1.2 Effects of Potential Future Rapid/Transit Extensions on Orange Line Ridership

Regional transportation plans have considered two possible extensions of the Orange Line beyond Forest Hills to Route 128 via the Needham Branch right-of-way; and to Hyde Park and Canton via the Penn Central main line and the Canton Branch right-of-way. If either or both of these extensions were to be placed into operation, a sizeable number of transit users would divert to stations on these extensions from the Forest Hills Station.

There would be a reduction of park-riders at the Forest Hills station if the Orange Line is to be extended from Forest Hills to either Route 128 on the Needham or Canton branch. It has been estimated that in 1980 approximately 400 park-riders would be diverted from Forest Hills to stations along the extension. By 1995, 350 park-riders would be diverted to these stations. Similarly, approximately 3,900 transit users would be diverted from Forest Hills to stations along the Orange Line extension which would include Forest Hills to Route 128 via the Needham Branch. It must be emphasized that these are merely transit diversions. They do not include diversions from other modes such as automobiles and commuter rail. They do not include diversions new transit trips encouraged by a higher level of service. If both extensions are placed into operation, an even greater number of transit users would be diverted.

Thus, the impact of rapid transit extensions to either Canton or Route 128 at Needham would affect the number of boardings at only the Forest Hills station on the proposed Relocated Orange Line.

### 5.1.3 Computer Rail and Amtrak Ridership

Commuter-rail ridership and Amtrak ridership are important factors in developing alternatives in the Southwest Corridor. Demand for rail ridership will determine the number of trains per hour to be operated on the main line of the Penn Central. The number of trains will in turn determine the number of tracks needed by commuter rail and Amtrak trains in order to operate at the necessary level of service to meet anticipated ridership demand.

According to the 1974 MBTA Audit which is a headcount of all suburban commuter-rail passengers, a total of 4418 passengers are carried in the inbound direction each day. The breakdown is as follows:

- Providence Main Line - 1787 passengers
- Needham Branch - 1367 passengers
- Franklin Branch - 1015 passengers
- Stoughton Branch - 249 passengers

Ridership on these commuter lines, projected to 1980, based on a moderate increase of service described in Appendix C are as follows:

- Providence Main Line - 2200 passengers
- Needham Branch - 1900 passengers
- Franklin Branch - 1500 passengers
- Stoughton Branch - 700 passengers

Therefore, a total of approximately 6,300 passengers would be riding the commuter-rail system on a daily basis in 1980 in the inbound direction.

Current Amtrak ridership figures indicate a daily ridership of 3391 passengers at the New Haven checkpoint (May 27-June2, 1975). Future ridership is estimated by the Federal Railroad Administration to be approximately 22,400 high-speed inter-city rail passengers arriving or departing from South Station in their design year, it is estimated that the peak-hour one-way ridership at South Station will be approximately 1,700 passengers (arriving or departing). These ridership forecasts are based on trains arriving or departing from South Station in Boston at fifteen-minute intervals during the peak hours of operation.

### 5.1.4 Feeder-Bus Systems

As a result of the proposed Orange Line relocation west of the present elevated Orange Line, a number of changes must be made to the present MBTA feeder-bus system. Ridership estimates for this revised feeder-bus network have been made for each station on the Relocated Orange Line.

The number of rapid-transit patrons who arrive at stations by bus on the Relocated Orange Line is expected to increase from the base year No-Build alternative forecasts. Approximately 9,500 additional rapid-transit patrons would arrive at rapid-transit stations by bus in the Relocated alternative on a daily basis in 1980. These ridership forecasts assume no new MBTA bus service in place of the existing bus service. However, a number of bus routes would be rerouted or consolidated to serve the new stations on the Relocated Orange Line.

A breakdown of the number of bus riders gaining access to the Relocated Orange Line rapid-transit stations on a daily basis is as follows:

- Forest Hills - 9,070
- Green Street - 270
- Boylston Street - 0
- Jackson Square - 5,250
- Roxbury Crossing - 4,100
- Ruggles Street - 5,900
- Massachusetts Avenue - 2,300

The number of persons who would arrive at the boarding transit station by bus would increase from 5,400 to 7,000 in the peak hour and from 18,500 to 26,500 on a daily basis between the No Build and the Relocated alternatives (from Massachusetts Avenue to Forest Hills). This increase in bus ridership would mean an increase in the number of buses required to serve this demand.

The feeder bus routes proposed to serve the Relocated Orange Line are shown on Fig. V-4. This proposed route diagram shows the changes that would be required in the existing routes to serve the Relocated Orange Line stations. On the basis of these proposed routes and schedules, the Forest Hills, Ruggles and Jackson Square Stations would be the most important bus-transfer locations. No significant routing changes would be needed to serve Forest Hills station. The major routing changes would relate to providing bus service to Jackson Square and Ruggles Street stations in lieu of servicing Egleston and Dudley Street stations. Within the Roxbury area, the proposed arterial street would be one of the most important feeder streets. Other important bus-circulation streets would include sections of Washington Street and New Dudley Street. The existing and proposed route pattern disperses the bus loading to many streets, thereby avoiding high concentrations of buses except in the immediate vicinity of the proposed stations. In addition, some passengers will transfer from the Green Line to the Orange Line at Forest Hills.

### 5.1.5 Local Traffic Generated by Transit-Related Development

While there would be efficiencies gained on bus routes that traverse new arterial streets, there would be some local traffic generated by the development of the Relocated Orange Line stations. This traffic would be generated by "new" transit riders who reach the transit stations by automobile or bus. The

concentrations of this traffic would be diverted from existing high-density areas at Northampton, Dudley Station and Egleston Square and shifted to new areas in the cleared-land corridor at Ruggles Street and Jackson Square.

Since the demand for parking around transit stations is constrained by parking capacities in the Relocated alternatives as well as the No-Build alternative, there would not be an increase in the number of park-riders. Thus, there would not be an increase in the number of automobiles on the streets in the vicinity of the transit stations due to the park riders. However, there would be an increase in the number of transit riders who get dropped off at transit stations by auto or taxi. Approximately 900 more passengers would be dropped off at the transit stations between Forest Hills and Massachusetts Avenue on a daily basis between the No-Build and the Relocated alternatives. However, this translates to an increase of about 45 automobiles in the peak hour around these same transit stations. Therefore, there would not be an appreciable increase in the number of automobiles gaining access to the transit station on the Relocated Orange Line.

There would be some commercial development in the vicinity of several of the stations.

At the smaller stations, such as Green Street and Boylston Street, the commercial development would be relatively small and would be oriented primarily toward transit passengers. Accordingly, the amount of traffic that would be generated by this type of development would be minimal.

At the larger stations, the commercial development would attract traffic in addition to the transit riders. The magnitude of this traffic generation would be comparatively small in relation to the traffic generation of the surrounding area. In developing the traffic projections for the Southwest Corridor, new development was allocated to appropriate traffic zones. Therefore, traffic projections that were developed for the area included the proposed developments on an area basis rather than developing traffic projections for each parcel. At the stations where significant commercial development is proposed, such as Forest Hills and Ruggles Street, off-street parking is proposed as part of the development program.

#### 5.1.6 Arterial Street Impacts

To assess the impacts of traffic volume on the streets affected by the proposed alternatives, traffic projections were made by the Central Transportation Planning Staff for three basic networks for the years 1980 and 2000. The networks for which assignments were prepared include the following:

a) The existing street network which also represents the "No Build" alternative.

b) The existing street network modified to include an arterial street to be constructed from Massachusetts Avenue at the Southeast Expressway ramps to Jackson Square. This alternative will be identified as "Arterial to Jackson Square".

c) The existing street network modified to include the same arterial street shown in (b) but extended from Jackson Square to Forest Hills. This alternative will be identified as "Arterial to Forest Hills".

The basic network was developed for traffic projection purposes to reflect the arterial street completed to Forest Hills. It does not differentiate between the various options discussed in other sections of this report. These options would involve the detailed location of the proposed arterial street as to whether it is to be east or west of the railroad or whether the railroad would be elevated or depressed. Since these options would all provide the same vehicular transportation service or would have the same or similar side-street

# SOUTHWEST CORRIDOR TRANSPORTATION IMPROVEMENTS

## ENVIRONMENTAL IMPACT ANALYSIS

MASSACHUSETTS BAY TRANSPORTATION AUTHORITY
MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS

## BUS ROUTES
### RELOCATED ORANGE LINE


1. Harvard - Dudley
10. City Point - Ruggles
13. Savin Hill - Ruggles
15. Kane Sq. - Jackson Sq.
16. Andrew Sq. - Jackson Sq.
17. Fields Corner - Andrew Sq.
19. Fields Corner - Ruggles
22. Ashmont - Jackson Sq. via Talbot
23. Ashmont - Ruggles
29. Mattapan - Jackson Sq.
41. Center St. - Dudley
42. Forest Hill - Essex
43. Jackson Sq. - Park St.
44. Seaver St. - Ruggles St. via New Dudley St.
45. Franklin Park - Ruggles St.
46. S. Huntington - Jackson Sq.
47. Andrew Sta. - Central Sq. via Boston City Hosp.
66. Allston - Dudley
68. Boston City Hosp. - Copley Sq.

FREDERIC R. HARRIS INC.

SCALE 0 1200 2400 3600

NORTH

FIGURE V-4

connections, there would be no significant traffic assignment differences between the several options. Accordingly, the traffic assignments presented will only distinguish between the three basic alternatives and the two target years of 1980 and 2000.

The traffic assignments for the design year 1980 and for each of the three basic networks, "No Build" and "Arterial-to-Forest Hills" are presented in Figs. V-6, V-7 and V-8 respectively. The corresponding traffic assignments for the year 2000 are shown on Figs. V-9, V-10 and V-11.

Traffic Growth

A comparison of the traffic-flow diagrams showing the existing street system, the "No Build" alternative shown on Fig. III-11 (existing traffic volumes - 1975) Fig. V-6 (projected daily traffic volumes - 1980) and Fig. V-11 (projected daily traffic volumes - 2000) indicates no significant change in anticipated traffic volumes between 1975 and 1980. Between 1980 and 2000, a growth of approximately 10 percent is expected in the Southwest Corridor. This level of traffic growth is based on projected population and employment between 1980 and 2000 throughout the metropolitan area of Boston. Particular attention was given to the Southwest-Corridor study area which includes the future development being planned for the area and evaluates a present change in the modal split of person trips in the corridor.

Comparison of Alternatives - "No Build" vs. "Arterial Built to Jackson Square (1980)

The traffic projected for the 1980 No Build alternative would exhibit the same characteristics as the existing street system. There would be no substantial change in the patterns of travel or in the volume of traffic on most of the streets in the study area.

Where comparison is made of the construction of the arterial street to Jackson Square in relation to the No Build alternative the most significant traffic impacts would occur in the northerly end of the study area. The construction would create a new street with significant improvement in alignment and grade. This improvement would attract some vehicular traffic on the arterial street which now uses other streets. An example of this traffic diversion can be seen by comparing the volumes projected on the group of streets crossing Massachusetts Avenue between Huntington Avenue and the Southeast Expressway. A Study of the total of all traffic in this Corridor indicates there would be about 4,000 motorists (a 3.08 percent increase) induced into the Corridor on a daily basis if the arterial is built to Jackson Square compared to a 1980 No Build alternative. The distribution of traffic on these streets would shift as a direct result of arterial street construction. The following tabulation compares the projected volumes of traffic on these streets.

1980 Projected Daily Traffic Volumes[1]

(in thousands)

| | No-Build | Arterial to Jackson Sq. |
|---|---|---|
| Huntington Avenue | 22.0 | 22.5 |
| Columbus Avenue | 15.0 | 11.0 |
| Tremont Street | 18.0 | 16.0 |
| Shawmut Avenue | 3.0 | 3.0 |
| Washington Street | 13.0 | 11.5 |
| Harrison Avenue | 8.0 | 9.0 |
| Albany Street | 13.0 | 17.5 |
| Southeast Expressway Ramps | 38.0 | 43.5 |
| | 130.0 | 134.0 |

[1]Screen line at Massachusetts Avenue

The proposed realignment of Columbus Avenue, at the intersection with the arterial, would serve to reduce the volume on Columbus Avenue and encourage motorists to follow the new arterial toward Massachusetts Avenue. This diversion explains the indicated increase in traffic projected for the Southeast Expressway ramps and Albany Street.

This traffic inducement would also be reflected on the main-line segment of the arterial street. In the No Build alternative, the segment of Columbus Avenue (north of Jackson Square) is projected to carry approximately 39,000 vehicles daily. With the arterial built to Jackson Square, the equivalent section would be expected to carry 42,500 vehicles daily in 1980. This increased amount of traffic would flow to the arterial on the existing feeder streets including Centre Street, Lamartine Street, Amory Street, and Columbus Avenue. Lamartine Street would be expected to receive the largest portion of this traffic impact or about 1,500 vehicles daily.

<u>No Build vs. Arterial Built to Forest Hills</u> (1980)

Construction of the arterial street from Massachusetts Avenue to Forest Hills would be expected to include an additional increment of traffic into the Corridor in comparison to either the No Build or arterial built to Jackson Square alternatives. At the Forest Hills end of the project, the induced Corridor volume would be expected to be about 8,500 vehicles daily. At the Massachusetts Avenue end of the project, the induced Corridor volume would be expected to be about 10,500 vehicles daily.

In Forest Hills, this daily traffic inducement would be reflected primarily on Washington Street (4,000 vehicles) Hyde Park Avenue (3,500 vehicles), and South Street (1,000 vehicles). At the Massachusetts Avenue end of the project, the most significant impact would be on the Southeast Expressway ramps with an anticipated increase of about 9,500 vehicles daily. Some additional changes would be expected in the distribution of the traffic on the other streets crossing Massachusetts Avenue. Traffic volumes on Huntington Avenue and Albany Street would be expected to increase while traffic volumes on Columbus Avenue, Tremont Street and Washington Street would be expected to decrease. Traffic volumes on Shawmut Avenue and Harrison Avenue would likely remain relatively stable.

A detailed comparison of the projected 1980 traffic volumes on the nobuild and arterial built to Forest Hills alternatives shows comparatively small changes on a number of streets generally perpendicular to the proposed arterial. In most cases the projected volume on a street perpendicular to the arterial increases under the arterial built to Forest Hills alternative. This shift in the basic travel pattern occurs because the arterial street would attract many motorists from the nearby areas who presently use other parallel routes. This shifting of local travel patterns would mean that through traffic on the north-south streets would be substantially reduced. The reduction in traffic would be partially off-set by local motorists who would change their travel pattern to get direct access to the new arterial.

If the arterial street were completed between Forest Hills and Massachusetts Avenue, anticipated daily volumes on the arterial would range between 29,000 vehicles daily at Forest Hills and 49,000 at Jackson Square. The section between Forest Hills and Jackson Square could expect daily volumes ranging between 29,000 and 36,000. Daily volumes in the section between Jackson Square and Ruggles Street would range between 49,000 in Jackson Square and 37,000 vehicles daily at Ruggles Street.

Probably the most significant impact of constructing an arterial street to Forest Hills would be the reduction of traffic on streets like Amory, Lamartine, Call, and Forest Hills. Only local residents or vehicles servicing there would use Amory and Lamartine Streets. Through traffic would use the arterial street. To assure traffic relief on Amory Street, the southern terminus at Green Street

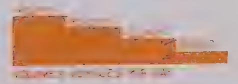
# SOUTHWEST CORRIDOR TRANSPORTATION IMPROVEMENTS

## ENVIRONMENTAL IMPACT ANALYSIS

MASSACHUSETTS BAY TRANSPORTATION AUTHORITY
MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS

## TRAFFIC 1980

DAILY TRAFFIC VOLUMES
ARTERIAL - NO BUILD



SCALE

0 1000 2000 3000

FIGURE

V-6

# SOUTHWEST CORRIDOR TRANSPORTATION IMPROVEMENTS

## ENVIRONMENTAL IMPACT ANALYSIS

MASSACHUSETTS BAY TRANSPORTATION AUTHORITY
MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS

## TRAFFIC 1980

### DAILY TRAFFIC VOLUMES ARTERIAL TO JACKSON SQUARE


FIGURE

V-7

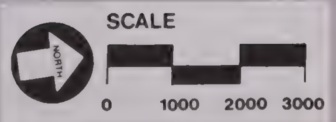
# SOUTHWEST CORRIDOR TRANSPORTATION IMPROVEMENTS

## ENVIRONMENTAL IMPACT ANALYSIS

MASSACHUSETTS BAY TRANSPORTATION AUTHORITY
MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS

## TRAFFIC 1980

### DAILY TRAFFIC VOLUMES ARTERIAL TO FOREST HILLS




FIGURE

V-8

# SOUTHWEST CORRIDOR TRANSPORTATION IMPROVEMENTS

## ENVIRONMENTAL IMPACT ANALYSIS

MASSACHUSETTS BAY TRANSPORTATION AUTHORITY
MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS

## TRAFFIC 2000

### DAILY TRAFFIC VOLUMES ARTERIAL - NO BUILD

SCALE

NORTH

0 1000 2000 3000

FIGURE V-9

# SOUTHWEST CORRIDOR TRANSPORTATION IMPROVEMENTS

## ENVIRONMENTAL IMPACT ANALYSIS

MASSACHUSETTS BAY TRANSPORTATION AUTHORITY
MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS

## TRAFFIC 2000

### DAILY TRAFFIC VOLUMES ARTERIAL TO JACKSON SQUARE


SCALE

0 1000 2000 3000

NORTH

FIGURE

V-10

# SOUTHWEST CORRIDOR TRANSPORTATION IMPROVEMENTS

## ENVIRONMENTAL IMPACT ANALYSIS

MASSACHUSETTS BAY TRANSPORTATION AUTHORITY
MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS

## TRAFFIC 2000

### DAILY TRAFFIC VOLUMES ARTERIAL TO FOREST HILLS

SCALE

0 1000 2000 3000

FIGURE V-11

would be relocated to join Brookside Avenue a short distance north of Green Street. The connection between Amory Street and Columbus Avenue, in Jackson Square, would also be relocated away from the Jackson Square intersection. This would allow local traffic and emergency vehicles easy access to the street while it would discourage "through traffic" on Amory Street.

Action would also be taken to assure traffic relief on Lamartine Street. It is proposed that the continuity of Lamartine Street be broken at several points. This could be done by eliminating a section of the street where existing land development would permit it without involving the legal right-of-access to adjacent properties. Only one or two such interruptions would be needed to discourage "through traffic" from using Lamartine Street and to encourage use of the proposed arterial.

Significant traffic reductions can also be anticipated on several of the other streets parallel to the proposed arterial. Washington Street would experience the greatest decrease in traffic volume largely because the geometric realignment that would be made just north of Forest Hills. The continuity between Washington Street and Hyde Park Avenue would be changed to emphasize the arterial street in preference to Washington Street.

Forest Hills, South, and Centre Streets as well as Jamaicaway, Columbus Avenue and Seaver Street would all experience some traffic reduction with the arterial constructed to Forest Hills in comparison to the no-build alternative. The amount of traffic reduction would not be as great as on the other streets already mentioned.

No Build vs. Arterial Built to Jackson Square

As previously indicated, the important difference between the traffic assignments for 1980 and 2000 would be a 10 percent increase in the volume of traffic by 2000 compared to 1980. This incremental increased percentage traffic volume would apply to each of the three basic alternatives.

To illustrate the changes in traffic volume expected during the years 1980 to 2000, a comparison can be made at Massachusetts Avenue - the same location previously discussed. We will use the same cordon line immediately north of Massachusetts Avenue, including all streets between Huntington Avenue and the Southeast Expressway ramps. The total volume of traffic, with the no-build alternative, projected to cross this line in the year 2000 is 144,000 vehicles compared to a 1980 total of 130,000 vehicles. The projected volume crossing this cordon line would be expected to increase to 147,000 vehicles daily under the "Arterial Built to Jackson Square" alternative and to 152,000 vehicles daily with the Arterial built to Forest Hills. The impact of the projected increase in traffic on the individual streets is shown below:

Projected Daily Traffic Volumes[1]
(in thousands)

| | No Build | | Arterial Build to Jackson Square | |
|---|---|---|---|---|
| Street | 1980 | 2000 | 1980 | 2000 |
| Huntington Avenue | 22.0 | 24.0 | 22.5 | 24.5 |
| Columbus Avenue | 15.0 | 16.5 | 11.0 | 12.0 |
| Tremont Street | 18.0 | 20.0 | 16.0 | 17.5 |
| Shawmut Avenue | 3.0 | 3.0 | 3.0 | 3.5 |
| Washington Street | 13.0 | 14.5 | 11.5 | 12.5 |
| Harrison Avenue | 8.0 | 9.0 | 9.0 | 10.0 |
| Albany Street | 13.0 | 14.5 | 17.5 | 19.0 |
| Southeast Expressway Ramps | 38.0 | 42.0 | 43.5 | 48.0 |
| Total | 130.0 | 144.0 | 134.0 | 147.0 |

[1]Screen line at Massachusetts Ave.

The pattern of traffic anticipated in the year 2000 would be essentially the same as in 1980. The streets that would be expected to absorb the greatest daily increases in traffic (comparing 1980 No Build with 2000 Arterial Built to Jackson Square) would include Huntington Avenue (2,500), Harrison Avenue (2,000), Albany Street (6,000) and the Southeast Expressway Ramps (10,000). Because of the geometric changes anticipated on Columbus Avenue in the vicinity of Ruggles Street, it is expected that the volume of traffic using Columbus Avenue would decrease between 1980 and 2000.

Shawmut Avenue and Washington Street would be expected to remain substantially unchanged between 1980 and 2000.

Comparing the projected 1980 daily-traffic volumes on the No Build alternative with the corresponding 2000 volumes on the Arterial Built to Jackson Square alternative, the streets that would receive the greatest increase in traffic volumes would be Lamartine Street (2,000 to 2,500 vehicles), Armory Street (1,000 to 1,500), Centre Street (2,500), Washington Street - south of Forest Hills (1,000), north of Forest Hills (1,500), south of Columbus Avenue (2,000), and north of Columbus Avenue (1,000). Other streets with similar projected traffic increases include Hyde Park Avenue (2,000), Forest Hills Street (1,500), South Street (2,500), Centre Street - south of Jamaicaway Circle (5,500), Jamaicaway (4,500). In the section where the proposed arterial street would replace Columbus Avenue, the projected daily volume in 2000 would increase to about 47,000 vehicles daily on the Build to Jackson Square alternative. As previously described, the local side streets between Jackson Square and Forest Hills would not receive any traffic relief with the Arterial built only to Jackson Square. The projected daily traffic volumes for the year 2000 for the No Build, Arterial Built to Jackson Square and Arterial Built to Forest Hills are shown on Figures V-9, V-10, and V-11 respectively.

No Build vs. Arterial Build to Forest Hills (2000)

The projected daily volumes in 2000 with the Arterial Build to Forest Hills would attract additional traffic into the corridor in the same manner as described earlier relating to 1980. At the Massachusetts Avenue cordon line, the total volume in 2000 would be expected to be about 152,000 vehicles daily compared to the 130,000 in 1980 for the No Build alternative. The following tabulation shows the expected distribution to the various streets for the Forest Hills alternative for 1980 and 2000 compared to the 1980 No Build projections.

Projected Daily Traffic Volumes[1] (in thousands)

| | No Build | Arterial Built to Forest Hills | |
|---|---|---|---|
| Streets | 1980 | 1980 | 2000 |
| Huntington Avenue | 22.0 | 25.0 | 27.5 |
| Columbus Avenue | 15.0 | 11.0 | 12.0 |
| Tremont Street | 18.0 | 16.0 | 17.5 |
| Shawmut Avenue | 3.0 | 3.0 | 3.5 |
| Washington Street | 13.0 | 10.5 | 11.5 |
| Harrison Avenue | 8.0 | 9.0 | 10.0 |
| Albany Street | 13.0 | 18.5 | 20.0 |
| Southeast Expressway Ramps | 38.0 | 47.0 | 50.0 |
| Total | 130.0 | 140.5 | 152.0 |

[1]Screen line at Massachusetts Avenue

The streets that are expected to receive the greatest impact in the year 2000 include Huntington Avenue, Harrison Avenue, Albany Street, and the Southeast Expressway ramps. Columbus Avenue traffic volume would be expected to decrease while the volume on the other streets including Tremont Street, Shawmut Avenue and Washington Street would be expected to remain substantially constant with respect to projected 1980 volumes.

The basic change in the pattern of travel in the study area would be the same in the year 2000 as previously described for 1980 with the arterial street built to Forest Hills. The streets running parallel to the arterial street would experience varying amounts of traffic relief while the streets perpendicular to the proposed arterial street would generally experience an increase in traffic because of the attraction that the arterial would create.

Very significant traffic reductions would occur on Amory and Lamartine Streets because of the design changes included in the proposed arterial street plans which would reduce the attractiveness of these streets to through traffic. This would mean that Amory and Lamartine Streets would be used almost exclusively for local access to adjacent properties. Other streets that would experience significant reductions in traffic with the arterial constructed to Forest Hills would include Washington, Forest Hills, and Centre Streets. Smaller reductions in traffic volumes would be experienced on the Jamaicaway, Columbus Avenue, and Seaver Street. The projected daily traffic volumes for the year 2000 (with the arterial street constructed to Forest Hills) is shown on Fig. V-11.

### 5.1.7 Level of Service

Evaluation of the level of service expected from the proposed arterial street is based on the conditions that would be likely to prevail at the various intersections along the arterial. Projected daily traffic volumes for 1980 and 2000 (including estimated turning movements at the important intersections along the arterial) were provided by the Central Transportation Planning Staff.

Based on estimates of daily traffic volumes, AM and PM peak-hour traffic volumes were calculated for each of the major intersections. Area traffic counts indicate that an average of about 8 percent of the daily travel occurs during each of the peak hours. These counts also indicate an average directional split with about 60 percent of the travel inbound during the morning peak hour and 40 percent outbound. During the afternoon peak, the directional emphasis reverses with about 60 percent outbound and 40 percent inbound. Intersection-capacity calculations were made based on these average values for peak-hour and directional emphasis.

The key intersections examined for capacity and level of service evaluation include the following:

- Arterial Street at Tremont/Columbus/Arterial Segment #1
- Arterial Street and Ruggles Street
- Arterial Street and Tremont/New Dudley Streets
- Arterial Street and Centre Street/Columbus Avenue (Jackson Square)
- Arterial Street and Morton Street
- South Street and Relocated Morton Street (extended)
- Relocated Washington Street and a new roadway connecting to Hyde Park Avenue
- Hyde Park Avenue and a new roadway connecting to Washington Street

Using these estimated values of turning movements, peak-hour volumes, and directional-movement capacity, the resulting levels of service have been calculated for AM and PM peak periods. A level of service of "C" or better can be obtained at six of the intersections during the morning peak hour in 1980. This can be achieved by providing additional left-turn lanes at the intersections of the Arterial Street and the intersection of the Arterial Street and Morton Street. At Jackson Square, a level of service "D" can be

anticipated during the morning peak hour in 1980 providing additional intersection approach lanes are provided both on the arterial northbound approach and on Centre Street.

During the afternoon peak hour in 1980, the level of service is expected to be a little more than during the morning peak hour because of the concentration of turning movements anticipated during the afternoon. With the modifications mentioned above, a level of service of "D" or better can be expected.

By the year 2000, the projected growth in daily traffic would be reflected proportionally in the morning and afternoon peak hours. Because the projected volume increase by the year 2000 is relatively small, only minor changes in the level of service should be anticipated. It is estimated that a level of service "D" or better can be achieved during the afternoon peak hour in the year 2000.

### 5.1.8 Pedestrian Impacts

A comparative analysis has been made of the locations where pedestrian crossings of the railroad right-of-way can be made presently or would be provided under each of the alternatives. The tabulation shown in Fig. V-12 identifies the location and the alternatives having pedestrian crossing capabilities.

FIGURE V-12

Locations of Railroad Right-of-Way Pedestrian Crossings South Cove to Forest Hills

| Street | NB-1 | FH-1 | FH-2 | FH-3 | FH-4 | FH-5 | FH-6 |
|---|---|---|---|---|---|---|---|
| Tremont Street | x | x | x | x | x | x | x |
| Arlington Street | x | x | x | x | x | x | x |
| Berkeley Street | x | x | x | x | x | x | x |
| Columbus Avenue | x | x | x | x | x | x | x |
| Clarendon Street | x | x | x | x | x | x | x |
| Footbridge- Back Bay Station | | | | | | | |
| Dartmouth Street | x | x | x | x | x | x | x |
| Foot Bridge Follen/Braddock Park | x | x | x | x | x | x | x |
| W. Newton Street | x | x | x | x | x | x | x |
| Foot Bridge- Durham/W. Rutland Sq. | x | x | x | x | x | x | x |
| Mass. Avenue | x | x | x | x | x | x | x |
| Foot Bridge - Gainsboro/Camden Street | x | x | x | x | x | x | x |
| Footway - underpass | x | | | | | | |
| Bus service road | | x | x | x | x | x | x |
| Ruggles Station | | x | x | x | x | x | x |
| Ruggles Street | x | x | x | x | x | x | x |
| Prentiss Street | x | x | x | x | x | x | x |
| Station Street | x | x | x | x | x | | |
| Tremont Street | x | x | x | x | x | x | x |
| Cedar Street | | | | | | x | x |
| New Heath Street | x | x | x | x | x | x | x |
| Heath Street | x | x | R | x | R | R | R |
| Jackson Sq. Station | | x | x | x | x | x | x |
| Centre Street | x | x | x | x | x | x | x |
| Atherton/Mozart Streets | x | x | x | x | x | x | x |

R = Relocated

In the section between Centre Street (Jackson Square) and Boylston Street, pedestrian crossing opportunities would be provided at Atherton/ Mozart Streets in all Build alternatives as well as the No-Build alternative. In the Modified Embankment - Arterial East to West alternative a new vehicular bridge with associated sidewalks would be constructed 300 feet south of Atherton Street. The other Build alternatives would not require this structure and would have no pedestrian crossing opportunity at this location. However, three of the Build alternatives would have a bridge structure at Paul Gore Street which would not be included in the Modified-depressed Alternatives or the Depressed Rail/Transit Arterial Street Alternative. The Paul Gore Street Bridge sturcture would be closely associated with Boylston Station. The station design would provide additional pedestrian crossing opportunities not available with the No-Build alternative. All schemes including the No-Build would have pedestrian crossing opportunities at Boylston Street. The quality of pedestrian crossings provided with any of the Build Alternatives would be superior to those which now exist.

South of Boylston Street an existing pedestrian underpass would be eliminated by any of the build alternatives. A new bridge at Minton Street would replace this crossing capability in alternatives FH-1, FH-2 and FH-4. In the depressed-rail alternatives, a new pedestrian bridge could be constructed to provide a more direct pedestrian connection from the high land along Oakdale Street to the community facilities east of Amory Street. The vehicular bridge at Green Street would provide pedestrian connections under all alternatives.

The new Green Street Station would provide a new pedestrian connection not available under the No-Build alternative. Similarly, the extension of Gordon Street would provide additonal pedestrian flexibility with all alternatives except alternative FH-4 or the No-Build alternative. Pedestrian connections would be provided at Williams and McBride Streets with all alternatives.

In the Forest Hills Station area, major changes in pedestrian circulation would be associated with each of the build alternatives in contrast to the conditions presently existing. The major station complex would provide for internal pedestrian circulation for transfer between the various modes of public transportation. This internal circulation would also provide for direct station accessibility for kiss-and-ride as well as park-and-ride patrons.

With a No-Build Arterial Street alternative, pedestrians would be required to use the existing sidewalks, and intersections. The most important intersections are controlled by traffic signals including pedestrian signals

Assuming the No-Build Arterial was to be combined with any of the Build-Rail alternatives, the number of pedestrians using the street crossings would increase substantially. This increase would be caused by persons walking to and from the new Orange Line Stations and persons walking to and from the new land uses in the area including such major pedestrian oriented facilities as the Campus High School, the proposed Roxbury Community College, and the proposed Jamaica Plain II High School. Many other new facilities would further add to the number of pedestrians in the area.

Each of the Build Arterial alternatives would provide improved pedestrian facilities along with improved facilities for motorists. Each of the major intersections would be signalized for both motorists and pedestrians. The number of signalized intersections would be increased, thereby providing greater pedestrian protection. The facilities that would be provided would be essentially the same for each alternative.

At Forest Hills, a pedestrian overpass crossing Hyde Park Avenue would provide a conflict free route for pedestrians to gain access to the new station complex from the east. This quality of pedestrian protection is not presently available at Forest Hills. In fact, one of the heavily used access doors of the present Orange Line Station opens directly onto Hyde Park Avenue. There is no sidewalk adjacent to the building so that there is no visibility of pedestrian and/or motorists at this location.

FIGURE V-12 (Continued)

Locations of Railroad Right-of-Way Pedestrian Crossing South Cove to Forest Hills

| Street | NB-1 | FH-1 | FH-2 | FH-3 | FH-4 | FH-5 | FH-6 |
|---|---|---|---|---|---|---|---|
| Arterial Crossover | | | | | x | | |
| Paul Gore Street | | x | x | x | | | |
| Boylston Station | | x | x | x | x | x | x |
| Boylston Street | x | x | x | x | x | x | x |
| Footway-Underpass | x | | | | | | |
| Lorene Place | | | | | | x | x |
| Minton Street | | x | x | | x | | |
| Pedestrian Br. | | | x | | | x | x |
| Green Street | x | x | x | x | x | x | x |
| Green St. Station | | x | x | x | x | x | x |
| Gordon Street | | x | x | x | | x | x |
| Williams Street | x | x | x | x | x | x | x |
| McBride Street | x | x | x | x | x | x | x |
| Arterial Crossover | | | | | x | | |
| Roadway under Arborway | x | x | x | x | x | x | x |
| Morton Street | x | | | | | | |
| Forest Hills Station | | x | x | x | x | x | x |
| Asticou Rd./Walk Hill Rd. | x | | | | | | |
| Washington Street | x | x | x | x | x | x | x |
| TOTAL | 29 | 34 | 35 | 33 | 34 | 34 | 34 |

Note that in the section between Tremont Street in South Cove to Tremont Street in Roxbury, the number and location of pedestrian crossings of the railroad right-of-way would be the same for all alternatives with only three exceptions.

With the No Build alternative, the existing pedestrian underpass just north of Ruggles Street would remain unchanged. In each of the build alternatives, this pedestrian underpass would be eliminated.

Ruggles Street Station facilities including the bus circulation roadway would be constructed in this same area. The character or quality of the pedestrain crossing would be greatly improved in all of the build alternatives in comparison to the present 10-foot-wide underpass.

The proposed Ruggles Street Station would provide a spacious, lighted, and enclosed (protected) area providing pedestrian access to the station facilities from both sides of the rail right-of-way. In addition to the station a separate bus-circulation bridge would be included in each of the build alternatives. This bridge would be located at the north end of the station area. It would be built primarily for bus circulation but could also provide for pedestrian crossings as well.

Comparing the pedestrian crossing opportunities between Ruggles Street and Centre Street, the number and relative location would essentially be the same for all alternatives including the No Build. However, each of the build alternatives would provide more spacious and better lighted areas for pedestrian crossings than presently exist.

## 5.2 Project Construction and Impacts During Construction

This impact analysis considers alternatives in which several major factors are significant to the development of construction contract limits, methods, costs, procedures, sequence, duration and impacts.

For example, between Camden Street and Forest Hills, two depressed Rail/Transit alternatives (FH-1 and FH-2) require the removal of large quantities of excavated materials (3,000,000± cubic yards). The excavation generates construction costs, methods, duration and impacts unique to that segment. The Rail/Transit facility built on a modified embankment on the other hand, has its own set of construction particulars.

The Arterial Street, in purely construction terms, can be viewed as a separate facility which has little or no influence upon Rail/Transit construction. The street then, if built, could be constructed as a singular undertaking.

Between Camden and Dartmouth Streets, the refined alternatives lower the existing Penn Central track bed sufficiently (2-5 feet±) to allow minimum bridge clearances for intercity rail and transit service.

The Back Bay-to-South Cove segment considers the construction options for the Orange Line as being either approximately at existing track grade throughout, or in tunnel from South Cove to Dartmouth Street.

Over the entire project length two options are possible: either to maintain rail service within the Penn Central right-of-way or divert it to the Midland Division during construction.

The construction contracts and limits, defined in Section 5.2.1 below, were developed from logical break points which take into account the above mentioned considerations as well as methods and types of construction to be encountered, i.e., heavy earthwork and reinforced concrete, station and architectural work, roadwork, power, signals and communications. Other factors determining contract limits include: geophysical aspects, size of contracts, disposal of materials from the construction areas, delivery of materials and prefabricated items to the sites, population density in the project area and environmental concerns.

These limits or break points could be at the following locations irrespective of the alternative chosen.

| | |
|---|---|
| South Cove . . . . . . . . . . | Project limit-North |
| Camden Street . . . . . . . . | Beginning point for major earth moving contracts (cut or fill) |
| Mozart Street . . . . . . . . | Mid point for equal division of earth moving contracts (cut or fill) |
| Forest Hills . . . . . . . . | Project limit-South |

The demolition of the Washington Street elevated structure is conceived as one or two construction contracts between South Portal and Forest Hills to be executed after the new Orange Line is operative.

### 5.2.1 Construction Contracts

A project of this size has many diverse special items of work divided into a number of contracts. The number and type of contracts relates to the quantities involved, working and site restraints, and the need for contractor specialization in certain fields.

Analysis of these factors reveals that the project would most advantageously be made up of the contracts listed below, regardless of alternatives selected:

- 3 General Civil contracts for earthmoving, drainage, bridges, walls, landscaping, noise barriers. One contract (Contract #1) would be between the proposed South Cove Tunnel Portal and Camden Street. Two additional contracts (Contracts #2 and #3) would be employed so as to allow excavation volumes (cut or fill) to be divided equally between Camden Street and Forest Hills.

- 1 contract for Arterial Street and miscellaneous side-street improvements - grading, paving, lighting, utilities, etc. (Contract #4)

- 2 Contracts for railroad and rapid-transit track work (Contract #5a & 5b)

- 1 Contract for Orange Line power, including sub-station equipment (Contract #6)

- 2 Contracts for signals and communications - one for railroad, another for transit (Contracts #7a and 7b).

- Passenger stations contracts and electric sub-station contract (building only). From one to three passenger stations could be let as a single contract, depending upon their size and complexity. Three Station Contracts were assumed for analysis purposes:

  8a & b Back Bay, Massachusetts Avenue;
  8c & d Jackson Square/Roxbury Crossing, Ruggles;
  8e & f Boylston Street/Green Street, Forest Hills.

- Demolition of Washington Street elevated structure (Contract #9).

### 5.2.2 Construction Procedures and Phasing

Regardless of the alternative selected, from among the "build" possibilities, it is clear that the Southwest Corridor project represents a significant construction undertaking. As such, a precise definition of construction contract limits, phasing, duration and costs is particularly important in determining impact.

This sub-section deals with the nine basic contracts (suggested in 5.2.1 above) including anticipated construction procedures and phasing of work.

#### 5.2.2.1 Contract #1 - Line Segment - South Cove to Camden Street (SC-1)

As part of the South Cove project, the Orange Line would be constructed as a shield-driven tunnel crossing under the Massachusetts Turnpike Extension (Fig.IV-69, Detail A). Construction at this point for the Orange Line transitions from a shield-driven twin-arched tunnel to a cut-and-cover twin box (Fig.IV-69, Detail B). This transition brings the MBTA tracks from a 10° curve (R= 573') in the tunnel to an alignment parallel with the existing tracks above. The depth of cut for the twin box ranges from about 27 feet at the end of the tunnel to about 21 feet at the end of the twin box, which is also the portal - located approximately 200 feet east of Tremont Street viaduct.

From the portal, the Orange Line construction changes to an open cut U-shaped boat section with a heavy-bottom slab, ascending to the existing grade at 4 percent (Fig.IV-69, Detail C). The Orange Line at this point is located to the south of the two relocated Boston and Albany railroad (B&A) tracks and north of the three proposed Amtrak and commuter-rail (railroad) tracks. The B&A tracks will be relocated slightly to the north. The railroad tracks are also shifted slightly southward.

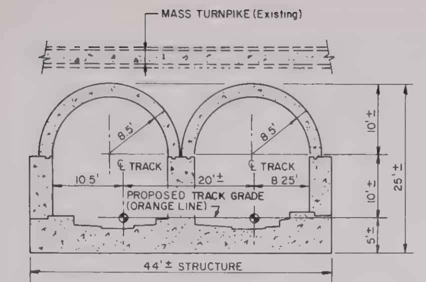
# SOUTHWEST CORRIDOR TRANSPORTATION IMPROVEMENTS

## ENVIRONMENTAL IMPACT ANALYSIS

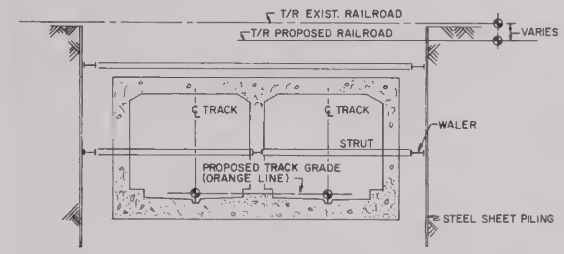
MASSACHUSETTS BAY TRANSPORTATION AUTHORITY
MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS

# CONSTRUCTION DETAILS

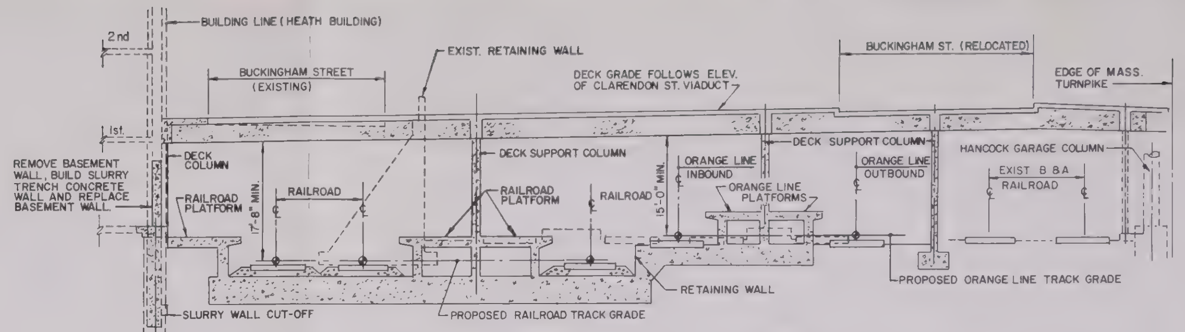
## SOUTH COVE TO CAMDEN SC-1



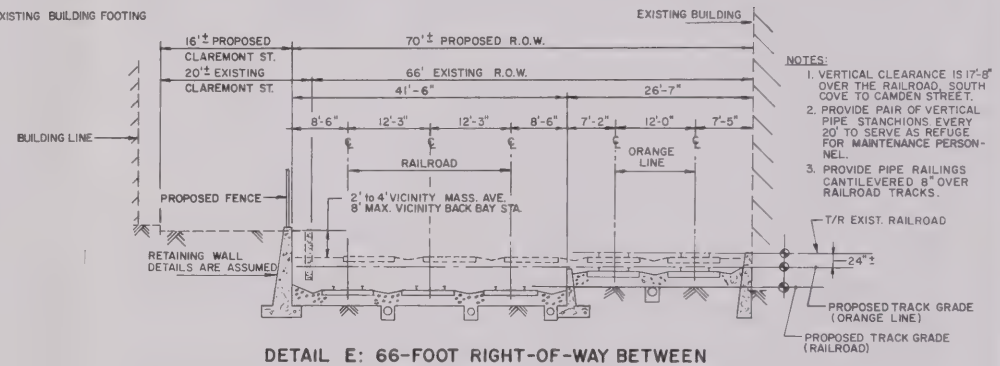

DETAIL A: TWIN-ARCHED TUNNEL
SECTION AT STATION 320+50
(BY OTHERS)




DETAIL B: TRANSITION SECTION TWIN-BOX
SECTION AT STATION 318+00
(BY OTHERS)

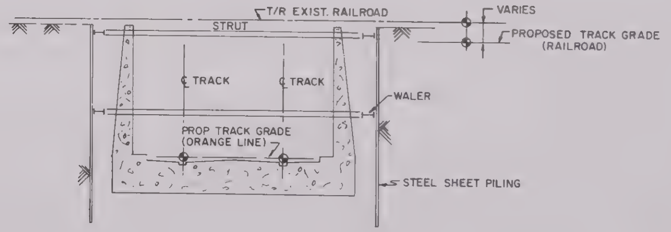



DETAIL D: HEATH BUILDING
SECTION LOOKING OUT-BOUND TAKEN SOUTH OF EXISTING CLARENDON ST. VIADUCT
ALT. SC-1




NOTES:
1. VERTICAL CLEARANCE IS 17'-8" OVER THE RAILROAD, SOUTH COVE TO CAMDEN STREET.
2. PROVIDE PAIR OF VERTICAL PIPE STANCHIONS EVERY 20' TO SERVE AS REFUGE FOR MAINTENANCE PERSONNEL.
3. PROVIDE PIPE RAILINGS CANTILEVERED 8" OVER RAILROAD TRACKS.

DETAIL E: 66-FOOT RIGHT-OF-WAY BETWEEN
BACK BAY STATION & CAMDEN STREET (LOOKING SOUTH)
ALT. SC-1




DETAIL C: U-SHAPED BOAT SECTION
SECTION A STATION 290+00 ALT. SC-1
(BY OTHERS)

GENERAL NOTE:
"RAILROAD" REFERS TO FRA/AMTRAK AND COMMUTER RAILS.

NO SCALE

FIGURE IV-69

FREDERIC R. HARRIS INC.

The northerly contract limits for Contract #1, Alternative SC-1, are different for the Orange Line and the Railroad. Orange Line construction begins where the South Cove project meets existing track grade. Railroad construction, on the other hand, starts further north cutting approximately 2 feet from existing track grade under Arlington Street to allow 17'-8" vertical clearance.

The geometry of the tracks westward is strongly influenced by the proposed track and platform configuration at the Back Bay Station. The railroad platforms for the station extend from east of Dartmouth Street to east of Berkeley Street and require that property takings along the southern right-of-way line.

As part of the relocated Orange Line project the viaducts that cross the right-of-way at Berkeley Street, Columbus Avenue, Clarendon Street and Dartmouth Street would be rebuilt since the southern abutment and the piers in each case will have to be relocated to accommodate the new tracks and platforms. Where these viaducts and bridges are rebuilt it will not be feasible to raise the structure in order to increase the headroom clearance over the tracks to 17'-8" (existing clearance varies between 15'-10" and 16'-6") because it is necessary to maintain present street grades. Furthermore, moving the new tracks to the south decreases the available headroom at the relocated southern abutment, since street grades on the viaducts generally slope down in the southerly direction. If a 17'-8" vertical clearance is desired, it will be necessary to depress these tracks by about 2 feet. This 2± foot depression would be maintained throughout for the railroad tracks.

All bridges for local streets crossing over the railroad right-of-way will be reconstructed to their original widths. The existing retaining wall along the south side of the right-of-way from Berkeley Street to Clarendon Street will be relocated south as much as 40 feet.

The Orange Line and the relocated Boston & Albany railroad (B&A) tracks will remain at the present grade north of Back Bay station. The difference in grades between the lowered Amtrak and commuter rail (Railroad) and the southerly or inbound track of the Orange Line can be maintained by a low retaining wall and the centerline distance between these two tracks has been increased to 17 feet to provide the required clearance for safety.

#### 5.2.2.1.1 Back Bay Station Area

The existing Back Bay Station on Dartmouth Street will be rebuilt to accomodate the 7 tracks proposed (3 railroad, 2 MBTA, 2 B&A), together with their various platform requirements. To accomplish this, the entire width existing between the face of the Heath Building (corner of Columbus Avenue and Buckingham Street) and the Hancock Garage (abutting the right-of-way) will be utilized. The Heath Building and the Hancock Garage can be maintained intact since their footings are founded well below the required excavation grades for the proposed Back Bay Station facility. However, the Heath Building will require some slurry cut-off wall construction below present basement level. The limited space available dictates that the proposed southerly railroad platform abut directly against the building's basement.

Columns will be constructed above the basement level to support a deck which spans the entire width between the Heath Building and the John Hancock Garage (Fig.IV-69, Detail D).

Below the deck, the two existing B&A tracks are to be maintained and five new tracks are proposed - three for Railroad (Amtrak and commuter rail) and two for Orange Line. The two Orange Line tracks will be served by a center platform, 23 feet wide at its widest and 410 feet long running along a R = 4,000' curve. The three new railroad tracks to the south will have two high platforms - one center platform 1,200' long and tapering from 24' to 12' in width, another 1,200 foot side platform, 12' to 24' wide. The two platforms will be on a 30-minute curve (R = 11,459') and will be designed to serve Amtrak passengers as well as commuters. The proposed railroad platforms are the same for the tunnel option (Section 5.2.2.2) except the locations are shifted some 30 feet to the north.

Buckingham Street between Dartmouth and Clarendon Streets will be relocated and integrated with the Back Bay station over the tracks. Existing utilities under the street will have to be relocated to other streets or maintained in the space above the railroad platform. The Buckingham Street exit to Clarendon Street will be relocated north of the existing one in order to provide station platform egress, convenient drop-off lanes for the station and to improve the intersection of Clarendon Street and Columbus Avenue.

#### 5.2.2.1.2 Construction South of Back Bay Station

Between Back Bay Station and Camden Street, the five proposed tracks (with walls and supports for an overhead deck) will require a width of 70 feet. The existing 66 foot right-of-way will have to be widened on the easterly side encroaching on existing Claremont and Carleton Streets. Takings will be necessary on the east side of the tracks at both the north and south edges of Massachusetts Avenue.

The southerly tracks would be reserved for AMTRAK and commuter rail and the northerly two for the Orange Line. Railroad clearances will be increased from 16' ± to 17'-8" under bridges in this reach by removing at least 2 feet of existing subgrade and placing the 5 tracks on ballast (Fig.IV-69, Detail E). The subgrade can be drained without lowering exist-groundwater levels appreciably. The Orange Line will be lowered by approximately 2 feet south of the Back Bay station with the three railroad tracks being dropped an additional two feet to better accommodate the proposed roof deck. Preliminary investigations indicated that existing walls and buildings abutting the right-of-way will not be structurally affected by the proposed depression in this area.

#### 5.2.2.2 Contract #1 Tunnel - South Cove to Camden Street with Orange Line Tunnel Option (SC-2)

The northerly work limit for Contract #1 Alternative SC-2 would be at the southerly termination of the bored portion of the Orange Line tunnel. At this point, the tunnel has already passed under the Massachusetts Turnpike. The bored tunnel configuration adopted consists of twin arch shaped tunnels for inbound and outbound Orange Line (see Fig. IV-69A, Detail A). It is aligned in such a manner as to allow the Orange Line to proceed parallel to and beneath the existing Penn Central trackage.

As soon as the Orange Line alignment has been brought parallel to the existing tracks above it, the shield-driven tunnel construction can be stopped and the construction method can be changed to twin side-by-side cut-and-cover boxes. This changeover also required a transition section (Fig.IV-69A, Detail B) which will bring the tracks from 20 feet on centers and approximately 27 feet below railroad track grade back to 15 feet on centers and about 21 feet below track grade. Using a 10 degree curve (R = 573') and spirals for 40 mph-train-operating speed at this point makes the transition section approximately 200-feet long. At the end of the transition section the Orange Line continues westward in a close-

# SOUTHWEST CORRIDOR TRANSPORTATION IMPROVEMENTS

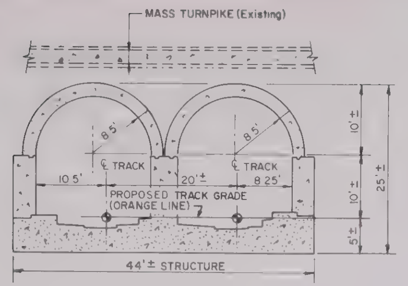
## ENVIRONMENTAL IMPACT ANALYSIS

MASSACHUSETTS BAY TRANSPORTATION AUTHORITY
MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS

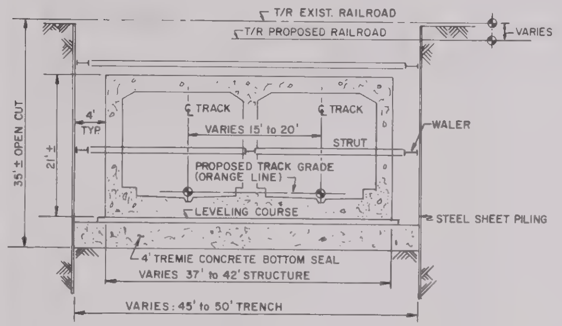
# CONSTRUCTION DETAILS

SOUTH COVE
TO
CAMDEN

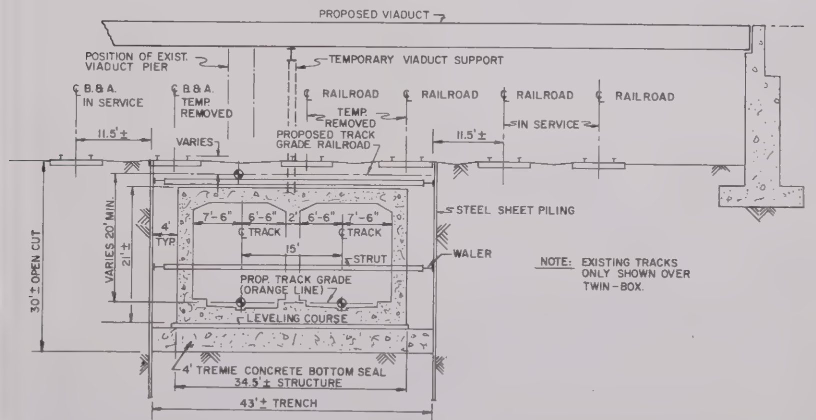
SC-2



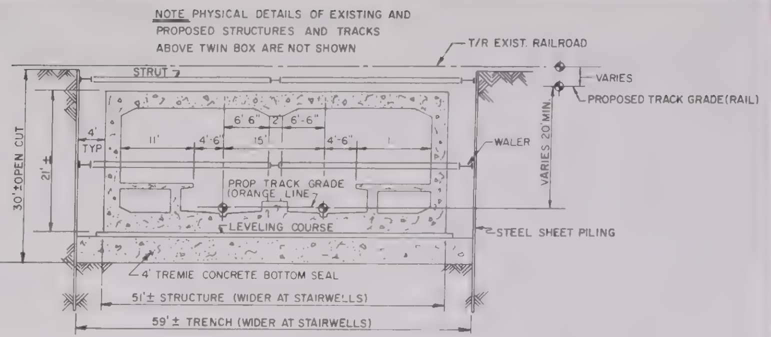

DETAIL A: TWIN-ARCHED TUNNEL
SECTION AT STATION 320+50
(BY OTHERS)



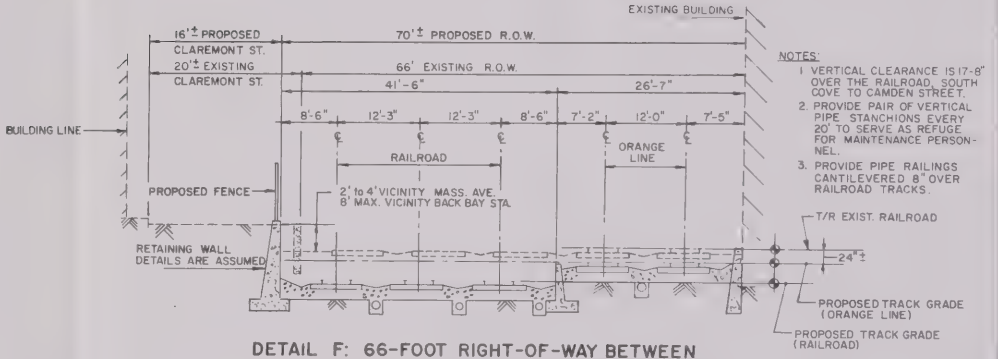

DETAIL B: TRANSITION SECTION TWIN-BOX
SECTION AT STATION 318+00
ALT. SC-2



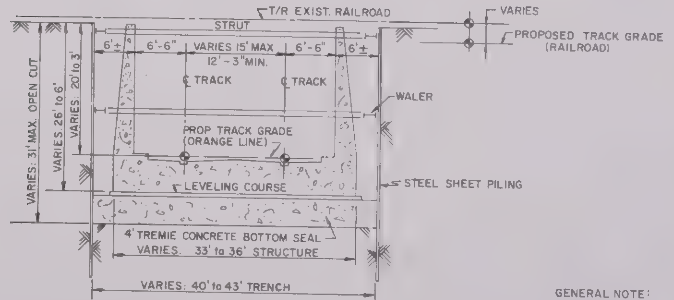

DETAIL C: CLOSE-COUPLED TWIN-BOX
SECTION AT STATION 307+00 ALT. SC-2




DETAIL D: TWIN-BOX WITH SIDE PLATFORMS
SECTION AT STATION 295+00
ALT. SC-2




DETAIL F: 66-FOOT RIGHT-OF-WAY BETWEEN
BACK BAY STATION & CAMDEN STREET (LOOKING SOUTH)
ALT. SC-2




DETAIL E: U-SHAPED BOAT SECTION
SECTION A STATION 290+00 ALT. SC-2

GENERAL NOTE:
"RAILROAD" REFERS TO FRA/AMTRAK AND COMMUTER RAILS

NO SCALE

FIGURE
IV-69A

FREDERIC R. HARRIS, INC.

coupled, shallow twin-box structures built by cut-and-cover methods. At the same time, the railroad tracks will be lowered to allow 17'-8" vertical clearance throughout the project length.

The ground water level is high in the depressed right-of-way cut between Shawmut Avenue and Camden Street and wide spread construction dewatering would be expected to cause adverse settlement of the adjacent retaining structures and buildings. Foundation-pile deterioration is also possible. Dewatering would also be expected to be excessively slow and expensive due to the silts and clays present in the general area.

To avoid having to dewater the general subsurface area, the cut-and cover construction method proposed will permit the water table to remain high. This is accomplished by driving tight sheet piling on both sides of the proposed trench to a point approximately 35 feet below track grade, excavating the trench in the wet and placing a substantial tremie concrete bottom sealing slab to stabilize the excavation bottom. The excavation is then progressively dewatered and the sheet piling is cross-braced by means of walers and struts at various elevations as soon as dewatering levels permit.

Once the trench is fully dewatered and braced, the construction proceeds in the dry. A thin, lean concrete leveling course will be placed between the tremie concrete and the structural concrete of the normal or transition twin-box structure to provide a reasonably level starting point.

After completion of the box structure the trench cross-bracing will be removed and the sheet piling will be pulled where possible. Re-use of the available sheet piling and walers and struts is contemplated with a normal attrition allowance for repeated usage.

The alignment proposed will permit the use of the southerly two Amtrak tracks and northerly Boston & Albany track during construction of cut-and-cover twin-box track structure (see Fig. IV-69A, Detail C). The distance between centers of the northerly Penn Central railroad and the southerly B&A track varies between 68 and 79 feet, leaving from 11.5 to 15 feet between operating track centers and face of sheet piling for the required 43-foot excavated Orange-Line trench width.

The only exception is in the transition structure area connecting the twin shield-driven tunnel section with the close-coupled twin-box section. The transition structure at its widest point requires a trench width of approximately 50 feet between faces of sheet piling. In this reach it is proposed to temporarily relocate the northerly B&A track some 5 feet north closer to the Massachusetts Turnpike in order to provide a ten-foot clearance between operating track center and sheet-piling face.

Construction of the cut-and-cover transit tunnels under the existing railroad cut will require the removal from service, of the various street bridges and viaducts presently crossing the depressed Turnpike and railroad right-of-way. These structures will have to be taken out of service one at a time in order to minimize traffic rerouting problems. They will be partially or completely dismantled over the railroad right-of-way to permit the cut-and-cover operations for the transit line to proceed. These bridges will be rebuilt and their pier locations will be integrated with the new transit twin box structure.

#### 5.2.2.2.1 Back Bay Station Area

The close-coupled twin-box structure for the Orange Line will run from under the Tremont - Arlington Street viaducts to a point between the Clarendon and Dartmouth Street bridges, where the proposed Back Bay transit station will be located and integrated with the proposed rebuilding of the Back Bay railroad facility. The type of transit station

structure best suited to the twin-box line structure would incorporate a shallow, side platform for the Orange Line (see Fig. IV-69A, Detail D). The shallow side platform configuration has the advantage of reducing construction costs and difficulties, elimination of vertical transitions before and after the platform and reducing the total project structure length. The side platform layout also eliminates costly horizontal track spreading transitions at both station ends that are required whenever close-coupled twin tracks are to be connected to a station utilizing a center platform. In order to remain shallow, the passenger interchange between future railroad and Orange Line users will be at street level grade. The present Back Bay station will have to be removed down to railroad level in general and down to the column footings within the area occupied by the twin-box line structure or the station structure. The construction of the transit portion of the Back Bay station would be accomplished by the same sheet pile lined trench described for the close-coupled twin-box line structure, but in this case the trench required is approximately 60 feet wide.

#### 5.2.2.2.2 Construction South of Back Bay Station

West and south of the proposed Back Bay Station the transit track tunnel alignment swings to the westerly side of the present depressed railroad right-of-way and comes up to grade north of Harcourt Street. The track structure changes from twin-box structure to an open-cut "U"-shaped structure of diminishing depth (see Fig. IV-69A, Detail E). The "U"-shaped structure is constructed by the same building scheme as described previously, utilizing cross-braced sheet pile trench walls and a tremie concrete base slab to control uplift and buoyancy forces. As the transit grade rises the construction becomes lighter, and when transit top of rail comes to within 3 feet of existing grade the "U" shaped structure is discontinued and the remaining section is built in simple cut.

The open-cut "U" shaped structure starts at the tunnel portal approximately 220 feet south of Dartmouth Street, and ends at a point 650 feet south of Dartmouth Street. To allow room for the structure, the existing low retaining wall between the Massachusetts Turnpike and the railroad right-of-way would have to be relocated about three feet to the west infringing on Turnpike property.

Between Back Bay station and Camden Street, the five proposed tracks would be accommodated in a 70-foot right-of-way. Construction techniques utilized to provide 17'-8" vertical clearance for all tracks are as described previously in Section 5.2.2.1.2 (see Fig. IV-69A, Detail F).

### 5.2.2.3 Contract #2 Depressed - Camden Street to Mozart Street Rail Service Discontinued During Construction (FH-1,2)

Due to the large quantities of earth to be removed between Camden Street and Forest Hills, it is considered desirable to divide the total quantities equally between those two points, removing half to the north and half to the south on rails. Mozart Street, therefore, would represent the contract limit-south for Contract #2. Camden Street would represent the contract limit-north. Station construction is anticipated as separable from the line segment work and would proceed in proper sequence but under different contracts.

Earth excavation would be accomplished with the use of heavy equipment, such as front end loaders, large trucks and cranes. The excavated material would be loaded into railroad gondolas for disposal. There are no spoil areas available in the immediate greater Boston area and hauling vast quantities of earth through the narrow, crowded streets is unacceptable; it slows construction progress and impacts adjacent communi-

ties. Movement of the excavated material by railroad to the north for this contract is feasible.

As the existing embankment would be excavated and the material hauled along the right-of-way to a loading point, existing structures could be removed and also disposed of via rail.

At an optimum distance behind the excavation of existing railroad embankment, steel sheeting would be driven on both sides of the proposed below-ground structure to the depth necessary for this excavation and construction. Provision would be made for utilities crossing the right-of-way by placing them in permanent or temporary locations as found necessary or desirable.

Upon completion of a portion of the sheeting, below-ground excavation would proceed. When the water table is reached, excavation would continue with "clam shells" or other equipment suitable to the conditions encountered. Excavation may be completed in the wet and "tremie" concrete (waterproof) used for the bottom slab between sheeting walls. Upon completion, dewatering may proceed by means of open pumping to permit the remaining concrete work to take place in the dry. Recharging of adjacent ground water table may be necessary during the dewatering period. Form work, reinforcement and finally concrete placement would be started and continued by increments to completion as excavation and sheeting proceeds ahead. Sheeting would be pulled after concrete is placed and reused further ahead prior to progress of below ground excavation. During the concrete placement, provisions would be made for station platforms, egress, drainage, ductwork, utilities, safety nitches, etc.

The option to construct retaining walls with integral bridge seats could be considered. This would provide built-in capability to add decking, where practical, at some future date should a desire or need for it develop.

Temporary street crossings would be replaced by permanent bridge structures and utilities would be positioned in their final location.

Track work, the work on the passenger stations, arterial road, power signals and communications would be initiated as the work becomes feasible in relation to concrete installation.

As the need for access to the construction site decreases, landscaping and noise attenuating measures will get underway with the final fencing being installed to insure safety and secure the site.

#### 5.2.2.3.1 Construction Methods

Reconstruction of the rail roadbed in a depressed section would require the building of new bridges over the right-of-way for local street circulation and accessibility of the proposed transit stations. New bridges will be constructed at the following locations:

Ruggles Street
Prentiss Street
Station Street
Tremont Street
New Heath Street
Heath Street
Centre Street
Mozart Street

Additional pedestrian bridges would be built as required.

All of the foregoing streets are presently spanned by railroad bridges which will have to be removed as the embankment comes down. Normally the bridge removal will take place while traffic continues to use the street. The only short period of interruption would occur when the actual heavy steel girders are actively being lifted out. This work would be scheduled for off-peak traffic hours so as to cause as little inconvenience to the public as possible.

The width of the depressed "boat section" between interior wall faces varies from a minimum of 72 feet for the standard tangent section to 100 feet in width at the typical transit station. However, a station such as Ruggles Street, where facilities will be provided for both transit and commuter rail patrons, will require a cross-section width of 177 feet in the station area.

The depth of cut for the depressed section will be approximately 25 feet below the grade of existing streets that presently cross under the railroad embankment. This depth is necessary to provide required vertical clearance for electrified rail and transit operations and leave sufficient room to install a new bridge overhead to carry cross-street traffic across the depressed rail/transit. While the cross-streets are the primary factor in determining depth of depression, the depth does fluctuate as the height of terrain changes between streets.

This depressed section will intercept numerous active utilities which presently cross beneath the Penn Central track area. It will be necessary to intercept these services and provide temporary support systems or temporary relocations to facilitate construction. Some of the gravity flow services such as storm drains and sewer services will be reconstructed in siphons under the depression while others will be finally relocated in utility bays provided in the new cross-street bridges.

Stony Brook Culvert is the major service to be contended with. At Roxbury Crossing this 17'-0" x 15'-6" drain will have to be relocated to permit construction of the depression. At Ruggles Street, large diameter branches of Old Stony Brook culvert will likewise require relocation prior for construction of the depression.

The Line Segment from Camden Street to Mozart Street includes all phases of heavy construction. Initial work would be the excavation of an above-ground embankment approximately 18 feet high with granite retaining walls along much of its length. It is anticipated that excavation would proceed from south to north, with heavy excavating equipment loading the material to hauler units that would transport the material along the right-of-way to a convenient loading point. At this location, the material would be elevated onto railroad cars and hauled northerly to distant spoil areas as determined during the design phase. Concurrently with this excavation, the retaining walls would be demolished and would also be loaded out. Cranes with stone hooks would assist in this operation.

During the excavation, ties and rail would be removed and ballast stripped and stored if and as specified. Ahead of and concurrently with the excavation, existing bridges would be demolished and the steel and debris shipped out via railroad.

As soon as a sufficient distance would have been graded to approximately ground level or below as found convenient, sheet piling would be driven on both sides of the right-of-way at the back footing line of the proposed concrete "boat" section. A second excavation operation would then proceed. When the water table would be reached, the area would be dewatered as necessary and equipment suitable for wet excavation introduced. In dewatering, the water table outside the sheeting line would not be affected as recharging would be undertaken as required.

At each designated crossing street, a temporary crossing bridge would be installed prior to subsurface excavation. As soon as the "boat" section wall was completed in each area, the temporary bridge would be replaced with a permanent structure.

As the sheeting operation would progress, existing utility installations, including drainage culverts, would be relocated or hung on supports crossing the cut area. Some utilities would require relocating more than once to expedite the excavating operation.

When excavation and utility protection would have advanced a feasible distance, dewatering (and possibly recharging) would begin so that a foundation layer of gravel could be placed, the concrete "boat" section formed, the reinforcement installed and concrete poured. The section would be poured transversely in continuous operations for predetermined lenghts.

Provision would be made for collecting storm water from the "boat" section and pumping the runoff to an existing surface system. If necessary, the surface system would be modified or revised to take the quantity collected. It is anticipated that the quality or quantity so collected would not be materially different than that now being discharged to the existing system.

An adequate pumping system would be installed with pumps fed by two separate power sources plus standby diesel/generator equipment. All systems will operate on automatic controls with emergency capabilities built-in.

When the "boat" section would have proceeded for an optimum distance, the sheeting would be pulled and reused, the concrete walls backfilled and the area landscaped and protected by security fence. Six-foot chain link fence would be the standard method of protection.

All utilities presently crossing the right-of-way would be relocated to and supported by the proposed crossing bridge structures. Since these proposed bridges would be in general, at or in the immediate vicinity of existing crossing streets, utility relocation is not considered to be a major problem. However, in isolated cases it may be necessary to support a utility on an individual structure.

The existing storm-water and sanitary system would require modification because of the introduction of the depressed transit facility. The quantity and quality of the runoff would not be affected. Pumping would be required at certain points. Major drainage work would be involved in lowering the Stony Brook Culvert, as well as a large adjacent culvert. Siphon reconstruction of these culverts may be required to underpass the rail/transit depression.

Track would be spaced on 13 feet centers for the relocated Orange Line and on 14 feet centers for the railroad, with 14 feet minimum between the Penn Central and the Orange Line. Eight-feet six inches would be allowed between the centerline of the outer tracks and the nearest obstruction (in this case, the "boat" section wall).

Rail would be 115-pound R.E. for the Orange Line and 132-pound R.E. for the Penn Central. All rail and fittings would be new. The open-cut area would be fenced with chain-link fence.

### 5.2.2.4 Contract #2 Elevated - Camden Street to Mozart Street - Rail Service Discontinued During Construction (FH-3,4)

Construction over the entire length of this contract consists of widening and raising the existing embankment, an operation of relatively smaller magnitude when compared to the depressed alternatives. It is contemplated that suitable borrow material would be brought in and stockpiled prior to the detouring of railroad traffic. Rehandling of this material represents a major contract operation.

Existing railroad bridges over the local streets would be removed, the sub-structure demolished and new bridges constructed in more optimum locations. The new rail/transit structures would have longer spans to allow a more open atmosphere at the streets and sidewalks below. At station areas, bus drop-off and general station access also require wider street space, and therefore, longer bridge spans for the rail facility above. New retaining walls in the vicinity of the reconstructed bridges would be required. Pile support and consequently pile driving would be necessary for all bridge abutments, piers and retaining structures. The drainage and utility systems which currently cross the embankment at through streets require extensive reconstruction as flooding is currently a common occurence.

The project would be fenced and sound barriers included. Where possible, fencing and sound barriers would be combined to form a composite device which would provide adequate security. In addition, landscaping treatment for the elevated alternative, in an effort to mask the embankment would be much greater in scope as compared to the depressed alternative. Landscaping contracts, therefore, provide an important part of this general contract.

Construction scheduling is not considered complicated, but would require the demolition and construction of more than one bridge and station structure concurrently in order to expedite completion. Virtually all operations could be conducted concurrently throughout most of the length.

#### 5.2.2.4.1 Construction Methods

Reconstruction of the railroad embankment to accommodate the five new tracks in this contract will require the demolition of existing and reconstruction of new bridges at the following streets:

Ruggles Street
Prentiss Street
Station Street
Tremont Street
New Heath Street
Heath Street
Centre Street
Mozart Street

In view of the fact that new bridges carrying rail/transit traffic will be wider than present bridges spanning cross-streets, it is anticipated that bridge construction will permit vehicle traffic to remain on present streets. Some restrictions may occur and short periods of closure might be necessary during placement of structural steel. During periods of pile driving for new bridge piers or abutments, it may be necessary to move traffic away from the immediate construction operation. It would appear that such a move can be readily accomplished with paved detours adjacent to the work site even if it is necessary to remove portions

of embankment which will ultimately be widened. In any event, traffic interruptions of any unavoidable nature would not be permitted during morning and evening peak traffic periods.

In the elevated design, the utilities in the existing cross-streets will be subject to some relocation to accommodate the foundations for new bridges. The relocations would not be major and would likely be accomplished with one move. Stony Brook Culvert, the major utility service in the corridor, will require some relocation at Roxbury Crossing where the facility would be subjected to new pressures from bridge construction and proposed retaining walls. The Old Stony Brook Culvert at Ruggles Street will not be sufficiently impacted to require relocation or a siphon.

The proposed embankment will be reconstructed, where possible, to a height that will provide smooth underpass street profiles and develop the City of Boston's desire for 16 feet of vertical clearance under bridges.

The proposed embankment will also be raised to a height that will permit elevating the grade of some of the existing streets which sag under the embankment. The eliminating of street sags under the embankment combined with proper drainage systems preclude continued flooding during stormy periods.

The new embankment section will utilize existing granite masonry walls wherever possible together with newly constructed walls to contain the widened five track facility. The new embankment will have a normal minimum width of 80 feet from face to face of wall. Station areas, of course, would be widened to accommodate the new transit platforms.

The influx of new construction materials, wherever possible, would be handled by railroad. However, with the demolition of so many railroad bridges the utilization of city streets for some hauling access must be considered a reality.

Under the elevated option the additional earth material required for widening the embankment could be hauled in via rail car and stockpiled at a predetermined site. This would eliminate unnecessary cluttering of city streets except for the minimal rehandling from stockpile to placement area.

During this same period work could get under way for the demolition of portions of existing retaining walls and construction of new walls could begin. When the railroad no longer is critical for hauling in materials, bridge demolition and reconstruction would begin.

The demolition and reconstruction of bridges is the single most time consuming item of work in this contract. Bridge demolition will be accompanied or immediately followed by the relocation of utilities to provide an unimpeded work area for the new structure.

Bridge construction operations may very likely have to be scheduled so that major operations are not simultaneously taking place at two adjacent cross streets at the same time. While extensive precautions will be taken to protect traffic, the possibility of unnecessarily impacting the travelling public should not be permitted.

Since the embankment is of earthen construction, rain water will normally drain into the soil. At bridge overpasses, however, systems will be provided to catch all storm water and conduct it in a closed pipe to city drain systems. All bridge decks will be completely tight so that the dropping of debris onto the transit patron or the travelling public will be precluded.

The new five track system, like the depressed alternative, will have tracks spaced at 13 foot centers for the Orange Line and 14 foot centers for the Penn Central.

#### 5.2.2.5 Contract #2 - Modified Depressed - Camden Street to Mozart Street Rail Services Discontinued During Construction (FH-5,6)

Construction of the modified depressed alternative involves removal of the existing track bridges, rails, ties and ballast, levelling of the embankment, reconstruction of the local cross streets, the construction of retaining walls, the placing of ballast, laying of tracks and all other tasks associated with the construction of a rail/transit facility.

The present rail facility is situated on an embankment located near the low point of a valley which the rail follows in this area. The proposed modified depressed alternative would locate the rail/transit tracks about 10 feet below the surrounding terrain. In order to construct the facility in a depressed section and to bridge the local streets over the rail/transit facility the surrounding terrain would have to be raised ten to fifteen feet along the length of the contract.

Construction scheduling for this alternative is considered complicated mainly due to the difficulty in maintaining cross traffic throughout the Corridor.

##### 5.2.2.5.1 Construction Methods

This alternative would require the removal of the following track bridges:

Mozart Street
Centre Street
Heath Street
New Heath Street
Tremont Street
Station Street
Prentiss Street
Ruggles Street

Construction would proceed from south to north and the structures would be removed in the order given. Transportation of the dismantled structures as well as the rails, ties, ballast and granite blocks could be done by rail.

Following the removal of each structure and adjacent track, etc. the existing embankment would be levelled and additional material brought in when required to construct the area to appropriate finished grade. Sheeting would then be driven on both sides of the rail/transit facility at the proposed location of the back of footing and the section excavated. The depth of the section excavated would be ten to fifteen feet below the elevation of the surrounding area. Suitable excavated material would be used at the site for fill. Unsuitable material would be transported out of the area or used as slope dressing.

As the sheeting operation progresses, existing utility installations, including drainage culverts, would be hung on supports crossing the cut area. Some utilities would require relocating more than once as phasing of the excavating operation would dictate. The major utility in the Corridor is the Stony Brook Culvert. Where required, utilities which are to be placed in an inverted syphon would be constructed at this time. Construction of the walls for the rail/transit section would follow the excavation and utility relocation.

The local cross streets would be worked on concurrently, but would be restricted to a very precise timetable dictated by the maintenance of local traffic. In many cases the local streets would need to be reconstructed for a length of two to three hundred feet on either side of the tracks with fills in excess of fifteen feet. This type of construction precludes temporary roadways or stage construction of the local street and requires a long term closing of the street. Therefore, adjacent cross streets could not be worked on concurrently.

Local street bridges to be constructed under this contract would be:

Boylston Street
Mozart Street
Centre Street
Heath Street
Cedar Street
Tremont Street
Ruggles Street

Track work, the work on the passenger stations, arterial road, power signals and communications would be initiated as the work becomes feasible relative to the completion of significant lengths of the rail/transit section.

As the need for access to the construction site decreases, landscaping and noise attenuating measures would get underway with the final fencing being installed to insure safety and secure the site.

#### 5.2.2.6 Contract #3 Depressed - Mozart Street to Forest Hills - Rail Service Discontinued During Construction

Reconstruction of the rail roadbed in a depressed section would require the building of new bridges over the right-of-way for local street circulation and accessibility to the proposed transit stations. New bridges will be constructed at the following locations:

Boylston Street
Minton Street
Green Street
Gordon Street
Williams Street
McBride Street
Morton Street
Washington Street
Paul Gore Street

In addition, a pedestrian overpass would be built at Oakdale Street crossing both the tracks and the proposed arterial street.

As in the previous depressed section, the width of the depressed "boat section" between interior wall faces runs from a minimum of 72 feet for the standard tangent section to 100 feet in width at the typical transit station.

Again, the depth of depression will be approximately 25 feet with variations as set forth in 5.2.2.31.

Utility services will be intercepted and handled as in the previous depressed section. However, in this section Stony Brook Culvert is sufficiently removed from the construction site so that relocation of this major facility is not necessary. However, in coming out of the depression south of Forest Hills Station, Stony Brook is once again encountered. To overcome impacting this large facility, the grade of the depression through Forest Hills Station was raised sufficiently to allow a track grade which could overpass the culvert. The raising of the grade at Forest Hills Station also permitted laying out a local street pattern which provided better movement for station access and egress.

5.2.2.6.1 Construction Methods

The Line Segment from Mozart Street to Forest Hills would require construction procedures identical to those for the Line Segment from Camdem Street to Mozart Street (see Section 5.2.3.1).

5.2.2.7 Contract #3 Elevated - Mozart Street to Forest Hills - Rail Service Discontinued during Construction

Reconstruction of the railroad embankment to accommodate a new 5 track system in this contract will require the demolition of all existing and construction of new bridges at the following sites:

Paul Gore Street
Boylston Street
Minton Street
Green Street
Gordon Street
Williams Street
McBridge Street
Morton Street
Washington Street

5.2.2.7.1 Construction Methods

The conditions and construction procedures as outlined under Elevated Contract #2, Camden Street to Mozart Street (section 5.2.2.4.1), apply here equally as well since both contracts are similar in scope and content.

5.2.2.8 Contract #3 Modified Depressed - Mozart Street to Forest Hills - Rail Service Discontinued during Construction

Construction of the Modified Depressed alternative within the contract #3 limits would require the removal of the track bridge at the following locations:

Boylston Street
Green Street
Williams Street
McBride Street
Morton Street

Following the removal of the existing structures, the existing embankment would be reconstructed to the proposed design grades and sheeting would be driven for the proposed footings of the rail/transit walled section. The area within the sheeting would be excavated, the walls formed and the concrete placed. As the section proceeds local street bridges proposed to cross the rail/transit facility would be constructed. The structure would be located at:

Boylston Street
Minton Street
Green Street
Gordon Street
Williams Street
McBridge Street
Morton Street

Utility service interrupted would be handled as described in previous depressed sections.

5.2.2.8.1 Construction Methods

The Line Segment from Mozart Street to Forest Hills would require construction procedures identical to those for the Line Segment from Camden Street to Mozart Street (see Section 5.2..2.5.1).

5.2.2.9 Contract #4 Arterial Street - Ruggles Street to Forest Hills

5.2.2.9.1 - Segment 2

Segment 2 extends from Ruggles Street to Jackson Square generally parallel to the proposed rail/transit facility. To construct this segment the first phase would be to build a detour road which would replace the streets taken out of service while the Arterial Street was being constructed.

A detour road would be built between the intersection of Tremont Street and Ruggles Street and the intersection of Columbus Avenue and Centre Street at Jackson Square. It would be 4 lanes wide with connections at all cross streets now intersected with Columbus Avenue. When constructed, traffic would be transferred from Columbus Avenue to the detour road.

All existing pavement, curbing, foundations and any unsuitable material between the detour road and Penn Central right-of-way, within the limits of segment 2 would be excavated and removed from the job site.

The excavated material would be replaced with select material. The entire area within the described limits would be constructed to its final grade with the exception of the arterial street which would be constructed to the subgrade.

All utilities would be relocated and connections made to those previously relocated under the rail/transit facility construction contract. In the event the arterial street preceeded the rail/transit facility provisions would be made for the future connection. Catch basins, man holes and all roadway drainage pipes would be laid. During this pahse of the operation all cross streets would remain open to traffic after the sub-base has been placed and a temporary pavement laid.

The paving operation would begin south of the proposed intersection at Ruggles Street and would proceed southerly. As each cross street was reached, the cross street would be closed to traffic, the temporary pavement excavated and the permanent pavement laid with the joining of pavements done in conformance with accepted practices.

As the pavement phase is completed, street lighting, signalization and signs would be installed followed by the con struction of the sidewalks and the landscaping of the area between the arterial street and the rail/transit facility. The pavement connection to Ruggles Street and Columbus Avenue would be completed, land stripping and miscellaneous pavement markings would be opened to traffic.

The detour road would be excavated, the cross streets reconstructed and the area from the arterial street to the taking lines would be landscaped.

5.2.2.9.2 Segment #3 - Centre Street to Forest Hills

There were two alternatives developed for this segment, the first being an alignment completely on the easterly side of the rail/transit facility from Centre Street to Forest Hills. The second aligned on the easterly side of the rail/transit facility from Centre Street to Mozart Street. At Mozart Street the arterial street crosses beneath the rail/transit facility and would be located on the westerly side of the tracks to a point approximately 600 feet north of Morton Street where it would cross under the tracks to become aligned with Hyde Park Avenue at Morton Street.

There would be no detour road built in conjunction with segment three of the arterial street because no major street is being closed to traffic during the construction phase.

Arterial Street East

The construction of Segment 3 would involve the demolition of all buildings scheduled to be removed under the arterial street east alternative (FH-4). Following the demolition of the necessary buildings, modifications to the local streets would be made which include:

- The excavation of Lamartine Street between Roys Street and Hoffman Street. Utilities would be removed or rerouted as required.

- The excavation of Lamartine Street between Wyman Road and Paul Gore Street. Utilities would be removed or rerouted as required.

- The excavation of Lamartine Street between Boylston Street and Hubbard Street. Utilities would be removed and rerouted as required.

- The excavation of Oakdale Street from Green Street to a point 250 feet north of Green Street. A 90-foot diameter cul-de-sac would be constructed on Oakdale Street approximately 250 feet north of Green Street.

- The excavation of Bishop Street from Everett Street to the Penn Central right-of-way.

The local cross streets would be rebuilt from the rail/transit facility through the intersection location to meet existing grade east of the proposed arterial street. Utilities within the cross streets would be relocated and adjusted during the reconstruction.

All utilities, drainage structures and pipes would be installed. The area within the taking lines and the rail/transit facility would be landscaped. The arterial street would be interfaced with the cross streets, the connection with Centre Street and Morton Street made, pavement markings applied, lighting, signalization and signing installed and the facility opened to traffic.

#### 5.2.2.9.3 Arterial Street West

The construction of Segment 3 - Arterial Street West, by necessity,would have to follow the construction of the rail/transit facility.

The first phase of the construction of Segment 3 would involve the demolition of all buildings scheduled to be removed under the Arterial Street West alternative (FH-4). Following the demolition of the necessary buildings, modifications to the local streets would be made which include:

- The excavation of Lamartine Street between Roys Street and Hoffman Street. Utilities would be removed or rerouted as required.

- The excavation of Lamartine Street between Mozart Street and Boylston Street. Utilities would be removed or rerouted as required.

- The excavation of Lamartine Street between Boylston Street and Hubbard Street. Utilities would be removed and rerouted as required.

- The excavation of Ballin Terrace, the removal or rerouting of utilities.

- The excavation of Lawndale Terrace from the existing railroad embankment to a point 100 feet east of Lamartine Street.

- The excavation of Lamartine Place from the existing railroad embankment to a point 200 feet east of Lamartine Street. A connecting street would be constructed between Lamartine Place and Oakdale Street approximately 150 feet west of the existing Penn Central railroad.

- The excavation of Oakdale Street between and a point approximately 250 feet north of Green Street. At that point a 100 foot diameter cul-de-sac would be constructed. All utilities would be removed and rerouted as required.

- The excavation of Call Street from Green Street to Everett Street along with the removal and rerouting of utilities as required.

- The excavation of Call Street from Hall Street to McBride Street. The utilities would be removed and rerouted as required. An improved connection would be constructed between McBride Street and Call Street and a replacement connection would be constructed between Hall Street and Boynton Street approximately 50 feet west of the existing Call Street.

Local streets which cross under the proposed rail/transit facility would be reconstructed to the final line and grade. All utilities would be adjusted as required. The final pavement would be placed with provisions for a stub connection to the Arterial Street. The cross streets would be open for traffic. The streets included are Mozart Street, Boylston Street, Minton Street, Green Street, Williams Street and McBride Street.

The section between Jackson Square to Marbury Terrace from the rail/transit facility to the limit of the takings would be cleared.

The Arterial Street would be constructed to the line and grade of the sub-grade and the remainder of the area within the project limits constructed to final grade.

The utilities and drainage pipes would be installed, catch basins and manholes constructed and the necessary connections to existing drainage systems and utilities made. Connections would be made to Mozart Street and Marbury Terrace, but the Arterial Street would not be open to traffic at this stage.

Proceeding south, the section from where the Arterial crosses beneath the rail/transit facility at Marbury Terrace to where it recrosses north of Forest Hills would be constructed.

The Arterial Street would be constructed to the line and grade of the sub-grade and compacted to the prescribed density. The utilities and drainage pipes would be installed, catch basins and manholes constructed and the required connections to existing drainage systems and utilities made. The connections to the cross streets would be made but the Arterial Street would not be open to traffic.

Morton Street relocation would be essential to the opening of the Arterial Street to traffic. Construction of Morton Street could be done at any stage of the project as it is independent of the other phases of this project. Morton Street West would be closed to traffic, the existing pavement excavated, the utilities and the drainage structures relocated or rebuilt as required.

The section of the Arterial Street between the undercrossing of the rail/transit facility and Morton Street is a short section, which includes a connection to Washington Street. The area would be cleared, and the arterial constructed. Utilities and drainage pipes would be installed, catch basins and manholes constructed, curbing set, and the gravel sub-base placed.

The area designated for landscaping within the taking lines for the entire length of the Arterial Street would be landscaped and the facility opened for traffic.

5.2.2.10 Contract #5 - Trackwork - South Cove to Forest Hills

Trackwork could be considered in one segment (Contract 5) from north of Berkeley Street to a connection with existing Penn Central tracks immediately to the south of Forest Hills. It is considered advisable, in order to expedite completion, that the work should be done under two separate contracts (Contract 5a and Contract 5b), one for railroad, the other for the relocated Orange Line.

Spreading of ballast, distribution of ties and laying of rails would proceed from south to north in order to allow uninterrupted delivery of welded rail strings 1500 feet long. It is not feasible to deliver from the north because there would be trackwork and civil construction in the Berkeley Street/Dartmouth Street area. In addition, there would be interference with rail traffic on the Boston and Albany and Penn Central lines between Back Bay, the Penn Central yard and Boston's South Station.

Rail welding into strings, joint grinding and weld testing could be performed off the project site at a location selected by the construction contractor and approved by the MBTA. Undrilled 115 pound RE rail would be used for transit and undrilled 132 pound RE rail would be used for railroad installations. An established welding plant would be desirable from an expertise standpoint; however, a portable plant could be sufficiently productive and possibly more efficient in making deliveries as required.

After welding, each joint would be ground to assure a true section and acceptable riding qualities. The rail strings would then be loaded on a rail train for delivery to the site. A rail train is composed of several tiers of supports mounted on flatcars which have been connected to form the rail train capable of taking many strings. The majority of the strings would be produced 1500 feet long. Some strings would be made to shorter lengths for connection to crossovers and insulated joints at impedence bonds.

Ballast would have been spread and ties placed an optimum distance ahead prior to rail delivery. Grade would be kept low so that completed track would be raised to exact profile grade during ballasting operations.

Upon delivery, strings would be "snaked" forward from the rail train, set in position and fastened to the ties sufficiently to let the train proceed on the track for the delivery of strings ahead. Between rail train operations, rail would be fastened permanently and rough ballasting performed. When one track would have proceeded a suitable distance, rail would be delivered for the second or third tracks. The train rail would move forward as far as possible on the completed track, rail strings would be anchored and the train backed out from under them.

Continuous strings would be field welded on the site, all rail clipped to the ties to control expansion and crossover installation and ballasting completed.

A choice of ties is possible. Wood ties have been used from early times and have given good service. Cresoted timber ties, though generally difficult to obtain in quantity, can be expected to have a minimum life expectancy of 25 years in transit service. Precast concrete ties would be readily obtainable. They would be heavier than wood and would offer greater resistance to rail stress. They could be spaced further apart than wood ties. Concrete ties would have a mugh higher life expectancy in transit service. However, concrete ties would allow current leakage sufficent to preclude the use of certain train control and cab signal circuits. This could be overcome successfully by introducing insulated track-mounting hardware.

The addition of resilient rail fasteners in the form of a neoprene pad between the rail and the tie or concrete tunnel invert will reduce vibration levels on the order of 5-10 dB compared to direct fixation. While this is an effective means of vibration control, it will not reduce noise.

There should be no difference in track-installation techniques should the track be on an embankment or in an open cut or depressed section. In any of these cases, there would be no operating railroad at approximately the same grade from which rail strings could be unloaded along the site expeditiously.

An alternative studied between the portal of the South Cove tunnel and the vicinity of Massachusetts Avenue places the transit tracks in a tunnel (see Section 4.4). In this area, the rail could be directly bolted to the concrete deck. Bolting to the deck would require insulation because of excessive current leakage which interferes with the track-signal system.

### 5.2.2.11 Contract #6 - Power Supply and Distribution (MBTA)

For the purposes of the impact analyses, two types of traction power were studied, Overhead Catenary System and Third Rail System. With either system, the traction power supply would have a voltage range of 450-690 volts dc. Under Contract #6, power, equipment and facilities would be installed as determined in final design.

#### Overhead Catenary System

The intercity rail (AMTRAK) and the Federal Railroad Administration (FRA) are required to provide an electrified overhead catenary system as part of the New England Corridor Project. The catenary supports for AMTRAK could be also used by MBTA Orange Line.

For the catenary alternative with depressed tracks, catenary wires would be supported from the boat section walls. Where the walls were lower than the required wire elevation, stub poles would be bolted to the top of the wall. Poles could also be installed from within the limits of the boat section walls. This support system, though feasible, is less desirable since it generally reduces side-clearance dimensions.

For the elevated-track alternative, catenary wires would be supported by steel-cantilever brackets mounted on reinforced-concrete foundations.

Supports would be spaced approximately 100-200 feet apart. The conductors would have feed ends spaced approximately one mile apart, at which point strain insulators would be installed. One feeder would be tied to the catenary at each pole.

#### Third-Rail System

To be compatable with the present operating Orange Line, the installation of a third-rail power system would be desirable. Such a system would eliminate the need for retro-fitting pantographs to the present rolling stock. Cost comparisons for the basic power system (substations not included) indicate that the capital cost for third-rail is approximately 15 percent less than that for catenary.

For safety reasons, in all alternatives, the right-of-way would be fenced. In addition, the catenary wires would be shielded in specific areas in order to protect against inadvertant contact.

### 5.2.2.12 Contract #7 - Signal and Communication System

The installation of the signals and communications system for the railroad facility would be done under Contract #7a. Equivalent work for the Relocated Orange Line would be done under Contract #7b.

Under either the track-depressed or track-elevated alternative, identical signal and communication systems would be installed. Under the depressed alternative, conduits for signals and communications would be hung on the walls of the boat section. Provisions would be made for connections to wayside signals, switch interlocks and trips, and to impedance bonds. For the track-elevated alternatives, signal and communication wiring would be in a duct bank along the right-of-way with manhole pullboxes spaced approximately every 500 feet. Connections to wayside trip catenary supports would be made for connection to wayside signals. Signal display mounts would be installed at locations selected during final design. Conduit would be provided for extending circuits to passenger stations, consoles and electric substations.

### 5.2.2.13 Contract #8 - Passenger Stations

#### 5.2.2.13.1 General

Three basic construction contracts are anticipated for the following stations:

8a and 8b Back Bay, Massachusetts Avenue
8c and 8d Jackson Square/Roxbury Crossing, Ruggles Street
8d and 8f Boylston Street/Green Street, Forest Hills.

Station buildings for Massachusetts Avenue, Boylston Street, and Green Street are considered prototypical for design and construction purposes. Their construction would most likely be similar, consisting primarily of reinforced concrete. Precast floor, roofs and platform canopies would provide attractrive cost efficient construction. Although architectural treatments would vary with each station, maximum use would be made of materials proven most effective for station finish. Where required, surfaces which are mark resistant or skid resistant or light transmitting or sound deadening would be utilized to minimize problems of safety, maintenance or station environment. Station graphics and components would be in accordance with MBTA standards.

No station building would be materially affected by decisions which relate to the construction of the arterial street. Station access and construction of external circulation systems, however, are generally less integrated into the roadway network without the arterial street.

#### 5.2.2.13.2 Forest Hills Station

The Forest Hills passenger station for depressed alternatives would be constructed on ground at the approximate elevation of Hyde Park Avenue. The basic concept of the station building would be the same regardless of whether the tracks were elevated or depressed.

Once the mainline track work gets underway, it will be necessary to terminate Orange Line service at a point north of the present Forest Hills Station complex so that an open, unimpeded work area will be available for new-station construction.

A temporary station could be constructed around the existing elevated track system in Washington Street. The northerly end of a new station would be approximately 750 feet north of the present Forest Hills station and adjacent to existing MBTA bus and Green Line terminal property. This location provides sufficient room for a temporary station with adequate patron access and egress. South of the temporary station location, sufficient elevated track could remain in service to provide a train turn-back. This entire temporary operation could be accomplished between the present Forest Hills Station and the proposed temporary station location. With the exception of new switches, no additional new track would be required. The remaining existing elevated track through Forest Hills Station could be removed to permit complete construction of the new Orange Line Terminal.

Once the existing elevated structure has been removed from the new station work area, the main track envelope could be completed and first-level construction of station and commercial space adjacent to Hyde Park Avenue could begin. The next stage would be the second level of construction for the proposed bus concourse adjacent to Hyde Park Avenue. Simultaneously, construction on the west side of the proposed station adjacent to Washington Street could be undertaken to accommodate the new Green Line trolley station.

Once the major heavy station construction at ground level is basically completed, work could proceed on the parking deck over the station-busway complex. Concurrently the reconstruction of Hyde Park Avenue, Washington Street and required bridge structures could be completed to provide a totally functional operating transportation terminal.

At all times during the construction of the Forest Hills Station complex, the travelling public will have vehicle access through the existing street pattern or by means of temporary adjacent detours.

The Forest Hills Station would be dependent upon the completion of Contract #3 (Mozart Street to Forest Hills). Since Contract #3 would proceed from north (Mozart Street) to the south in order to maintain railroad service for the disposal of excavation, Forest Hills would follow Boylston Street and Green Street in construction sequence. It would preceed Ruggles Street, Massachusetts Avenue and Back Bay.

#### 5.2.2.13.3 Green Street Station, Boylston Street Station Jackson Square Station, Roxbury Crossing Station, Ruggles Street/Northeastern Station

The layout of these stations would be virtually the same, some modification being required to meet access from adjacent streets.

Under the depressed-track alternatives, the buildings would be constructed on girders crossing the boat section. The girder bridge seats would be incorporated into the walls of the boat section. The decks for the buildings could be provided by prestressed, precast "T" girders or a reinforced slab resting on beams / box beams or composite sections. The passenger platforms would be constructed on the deck of the boat section, being tied in by reinforcing bars protruding from the boat section for that purpose.

If the tracks are to be located on an elevated structure, the passenger building could be constructed on conventional footings, as determined by soil conditions.

The overhead platforms could be supported on a girder system designed to support the transit and railroad loadings. Girder construction would likely be of steel, prestressed concrete or composit beams. Use of an open-truss system between adjacent streets would provide natural lighting and give better opportunity for surveillance of the station area.

The Ruggles Street/Northeastern Station would be designed to allow transfer between the Orange Line and commuter rail with future provisions for crosstown transit. For this reason, the configuration of the facility would differ markedly from that of the stations described above. The addition of the commuter-rail platforms increases the overall width at the station area to approximately 177 feet. This is an increase of about 77 feet in width over the protypical stations.

As Contract #3 proceeds southward from Mozart Street, first Boylston Street then Green Street would be scheduled for construction, both prior to Forest Hills. Jackson Square and Roxbury Crossing stations would follow shortly as Contract #2 proceed northward from Mozart Street. These would be completed before Forest Hills and Ruggles Street/Northeastern.

Ruggles Street/Northeastern Station would be the last station scheduled within the limits of Contract #2 (Camden to Mozart Street). It would follow Jackson Square and Roxbury Crossing station, but run concurrently with much of Roxbury Crossing construction. It would be scheduled ahead of Massachusetts Avenue to the north.

5.2.2.13.4 Massachusetts Avenue Station

The general configuration of this station would be similar to Green Street, Boylston Street, Jackson Square and Roxbury Crossing.

The Massachusetts Avenue Passenger Station would be supported by girders and columns over the proposed transit tracks which are depressed below street grade. The transit and railroad tracks would be approximately two feet lower than existing Penn Central track grade. The lower track grade has no effect upon station construction. The station platforms could be supported on a concrete foundation furnished under a previous Contract #1. The station building would probably be constructed of reinforced and precast-concrete.

Since the station would be located within the limits of Contract #1, which follows both Contracts #2 and #3 in construction timing, it is the final station to be scheduled for completion. It would follow all stations to the south, concurrently with the proposed station at Back Bay to the north.

5.2.2.13.5 Back Bay Station

Station construction for Back Bay was analyzed for two alternatives. Alternative SC-1 provides for all track passing the station to be approximately in the same grade. Alternative SC-2 places the transit below the railroad facility.

The construction of the Back Bay Station under Alternative SC-1 requires acquisition of land along the south right-of-way line of the existing Penn Central trackage. These acquisitions are required to accommodate two Boston & Albany tracks, 3 Amtrak tracks and two tracks for the Orange Line together with their respective passenger platforms.

The first step would be to reconstruct the retaining walls at the relocated southern right-of-way line, together with the street crossing bridges and viaducts. The three tracks closest to the southern right-of-way will be used for railroad operations. These tracks will be depressed about four feet below their current elevation throughout the station.

In Alternative SC-1, there will be a railroad side platform closest to the relocated and widened southern right-of-way line. This platform and part of the slab protecting the adjacent track against uplift will be combined with a vertical stem to form a cantilevered retaining wall (from the eastern end of the platform to a point adjacent to the Heath Building on the west side of Clarendon Street). Construction of this segment can proceed behind a protected cut braced by a system of tight sheet piles and walers which can be tied back or strutted into the right-of-way area.

Opposite the Heath Building the needed right-of-way space butts up directly against the basement wall of the building. Because of space limitations, this basement wall could be utilized as a part of the railroad platform side wall. The Heath Building is founded well below the anticipated level of station construc-

tion on footed caisson-type piles. The basement level of the building is about 12 feet above the excavation subgrade of the adjacent railroad foundation slab. This difference in elevation will require the construction of a 15 to 20 foot deep cut-off wall directly under the presently existing Heath Building basement wall. To accomplish this, the basement wall could be exposed, and demolished approximately 10 feet above basement level. A slurry trench cut-off wall would be built in sections between the existing foundation caissons to the required depth. The slurry wall will be reinforced and tied into the existing basement slab. The removed part of the Heath Building basement wall will be rebuilt after completion of the slurry cut-off wall.

The adjacent National Garage structure columns will be underpinned down to a level below the expected zone of settlement influence before excavation of Buckingham Street proceeds behind a tightly sheeted and braced or tied-back support system. In this area, the railroad platform will be combined with a cantilever stem to form the permanent retaining wall system. West of the end of the southern railroad platform, the existing masonry retaining wall and the abutment of the Dartmouth Street viaduct can remain in place since track-layout geometry does not require their removal. The Dartmouth Street viaduct will have to be rebuilt since the existing supporting columns are not compatible with the location of the new tackage.

Buckingham Street will be decked over in those parts which overlie the new Back Bay station. Utilities which lie in the bed of Buckingham Street between Dartmouth Street and Clarendon Street, Buckingham Street and the Hancock Garage will be decked over and supported on columns located between tracks, or on station platforms. A new line of deck support columns will be located adjacent to the Hancock Garage footings.

The three railroad tracks have been depressed by 5 feet as compared to the Orange Line and Boston & Albany tracks throughout the station. The depressed tracks would likely be founded on a concrete slab to protect them from up-lift pressures caused by high water table levels.

The existing Back Bay station superstructure and parking deck will be demolished down to existing track level. Limited use of the station is possible during reconstruction operations. The street viaducts at Berkeley, Clarendon, Cazenova, Columbus and Dartmouth Streets will be rebuilt in conjunction with the construction of the new south right-of-way line retaining wall. Traffic detours will be necessary and will be developed to minimize the impact of reconstructing these facilities. Arlington Street/Tremont Street will be reconstructed as part of the South Cove Tunnel Extension Project.

The construction of the Back Bay Station under Alternative SC-2 requires the rebuilding of the south right-of-way line retaining wall system to make room for the south railroad platform. However, less shifting of the right-of-way line is required in this scheme than under Alternative SC-1.

In this scheme the Orange Line tracks would be in a twin-concrete box below the existing trackage. In the vicinity of the Back Bay Station the two southerly railroad tracks would be placed directly over the Orange Line thus allowing the respective station platforms also to be placed over each other. The transit station is of the side platform type. The top slab of the twin-box Orange Line structure will be reinforced to accept the superimposed loads of the railroad service.

Construction would first proceed by building the proposed twin-box structure for the transit line in a tightly sheeted and crossbraced retaining structure. In order that ground-water levels might be maintained at near-normal levels, excavation between sheet pile walls will be excavated in the wet, and a substantial bottom tremie concrete seal will be placed. After the slab has set the excavation can be pumped out and cross-braced at appropriate levels. Construction of the twin-box structure can now proceed on top of the tremie seal.

After completion of the box structure the excavated ground would be back filled. The structure would then be ready to support the railroad facility loadings. All construction would be coordinated with the reconstruction of the street/viaduct crossings and new viaduct supports will be integrated with the twin-box structure.

After completion of the Orange Line twin-box and station structure, the south right-of-way line retaining wall can be rebuilt to accommodate the new south railroad platform. The new retaining wall from the east end of the platform to the eastern end of the Orange Line station structure combines a vertical cantilevered retaining wall stem with the railroad platform which serves as the base of the retaining wall.

Footings of the Heath Building consists of large diameter bellied caisson piles founded approximately at the level of the bottom of the tremie concrete base slab of the Orange Line Station structure. The adjacent garage, to the west of the Heath Building will probably require underpinning work on those column footings closest to Buckingham Street, especially the easterly ones which lie closer to the relocated south right-of-way line. Construction of the new south right-of-way retaining wall and street viaduct system will proceed behind a tightly sheeted and braced temporary support system. The bracing could consist of a tie-back system, or of the raker type braced against the existing Orange Line twin-box structure.

At the western end of station, the transit and railroad platforms end at the same point. From this point on, the existing retaining wall may be left in place, modified only to support the proposed decking over the Back Bay Station which would extend from Dartmouth Street to Clarendon Street and from Buckingham Street to the Hancock Garage. Buckingham Street would be relocated in the vicinity of Clarendon Street to permit incorporation of drop-off lanes and street access from the platforms below. The south abutment of Dartmouth Street would also remain in place, but the viaduct itself will have to be rebuilt to accommodate new support locations which are dictated by the proposed track layouts.

The existing Back Bay Station will be demolished down to existing track level together with the parking deck to the east of it. Limited passenger service can probably be maintained during reconstruction of the facility. The reconstruction of the viaducts over the trackage at Berkeley, Cazenova, Columbus, Clarendon and Dartmouth Streets will be scheduled to cause a minimum of disturbance to existing traffic patterns. The utilities in Buckingham Street will have to be relocated or maintained in place and provisions will be made to allow at least one traffic lane to remain in service during construction. Arlington/Tremont Street will be reconstructed as part of the South Cove Tunnel Extension Project.

The Back Bay Station could be scheduled substantially prior to Massachusetts Avenue Station to the south. Because of its complexity, considerable time would be allowed. Completion would be concurrent with the completion of the Massachusetts Avenue Station.

#### 5.2.2.14 Contract #9 - Demolition of the Washington Street Elevated Structure

The demolition of the existing Washington Street "El" would occur in two separate phases. The first section would be demolished from the south end of Dudley Station to the terminus at Forest Hills. The second section to be demolished would be between the south portal of the tunnel (about 800' north of Massachusetts Avenue) to and including Dudley Station. Demolition may occur on the completion of the relocation of the Orange Line to the Penn Central alignment. This contract would provide for the complete demolition of the entire structure six inches below the existing street pavement or sidewalk with necessary patching of same. The removal of all materials and debris from the site is also included.

The riveted structure has considerable section loss in many members, and, therefore offers little in the way of re-use as structural steel. It is anticipated that after removal of rail, ties and signals, the major longitudinal members will be cut free at the bents, loaded onto flatbed trucks with a crane and removed from the site.

The cutting of steel members will likely be accomplished by means of oxy-acetylene torch. As a result, hot metal beads would be dropped in the travelled way of Washington Street. A crane will be needed on Washington Street equipped with slings to hold the members being removed and to transfer these onto flatbed trucks.

These procedures will require periods of one-way traffic on short sections of Washington Street during some of the more minor demolition operations. Traffic police and barricades will be necessary to accomplish this. However, during the period when the main longitudinal structural members are being cut out and lowered to trucks in the narrow portions of Washington Street, the complete closing of a block-long section for a very short time may be required for safety. Obviously, detours will be necessary to accomplish this.

### 5.2.3 Construction Duration (Fig. V-13)

Obviously, the calendar time of awarding a major civil contract will have an influence on the contract duration. A mid-winter start-up will not be as expeditious as a start-up in the warmer months. However, for construction duration purposes it has been assumed that all operations (except landscaping) particularly concrete work, will continue for all months of the year.

South Cove to Forest Hills -
Depressed or Modified Depressed Rail/Transit with Arterial Street

The presumption here is made that all rail traffic has been temporarily relocated to the upgraded Midland Branch to provide an unobstructed right-of-way for construction. Under such conditions, and assuming the project to be structured into 3 major civil contracts, the anticipated total construction duration would be approximately 3 years and 9 months. However, if rail traffic is not diverted to the Midland Branch, but is to be maintained in the Corridor, and serve Back Bay Station, a temporary rail system must be provided to permit construction of the new rail/transit facility. This temporary system would be in the form of a 2-track railroad trestle from Forest Hills to just north of Ruggles Street. The construction of such an extensive trestle will require a lead time of 12 to 15 months resulting in a total contract duration of 5 years.

Rail/Transit on Modified Embankment with Arterial Street

It is again presumed here that all rail traffic will have been temporarily relocated to the upgraded Midland Branch to provide an unobstructed work area. Under these conditions, the reconstruction of the present railroad embankment to a new five track system will result in a construction duration of approximately two years and six months.

If rail service is to be maintained in the corridor and serve Back Bay Station, two options were evaluated, namely, reconstructing the embankment one-half at a time or the temporary trestle system. Reconstructing the embankment one-half at a time while maintaining rail service on two adjacent tracks was considered unacceptable and hazardous leaving only the temporary trestle option. As in the depressed scheme, this trestle will require a lead time of 12-15 months extending the construction duration for this option to approximately 3 years 9 months.

Depressed or Modified Depressed Rail/Transit without Arterial Street -
Rail/Transit on Modified Embankment without Arterial Street

The dominant construction undertaking is the construction of the rail/transit facility, be it on a modified embankment, depressed, or modified depressed. The rail/transit facility sets the pace and determines the overall schedule.

The Arterial Street, though a relatively important undertaking can be constructed in its entirety concurrently and totally within the scheduled time for the rail/transit facility. For this reason, the construction duration without the Arterial Street will not increase or decrease the scheduled times.

The scheduled construction durations are based on working a single day shift only. The maximum shift permitted would be from 7:00 am to 7:00 pm. Work prior to or after these hours would be permitted for demonstrated emergency purposes only. A failure to meet scheduled mile posts would not be considered an emergency.

(FIG. V-13)

CONSTRUCTION DURATION

| Combined Alternatives | Alternative Designation | | Construction Duration - South Cove to Forest Hills | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | South Cove to Camden St. | Camden Street to Forest Hills | South Cove to Camden St. | | Camden St. to Forest Hills: Camden St. to Mozart St. | | Camden St. to Forest Hills: Mozart St. to Forest Hills | | Total Project Time | |
| | | | Yr. | Mo. | Yr. | Mo. | Yr. | Mo. | Yr. | Mo. |
| • NO BUILD RAIL/TRANSIT, NO BUILD ARTERIAL STREET | NB-1 | NB-1 | | | | | | | | |
| • DEPRESSED RAIL/TRANSIT, NO ARTERIAL STREET | - | FH-1 | | | | | | | | |
| - with minimum grade adjustments, all tracks | SC-1 | - | 2 | 3 | 2 | 9 | 2 | 9 | 3 | 9 |
| - with Orange Line in tunnel to Dartmouth Street | SC-2 | - | 2 | 6 | 2 | 9 | 2 | 9 | 3 | 9 |
| - with Forest Hills Station elevated (option) | - | FH-1a | 2 | 3 | 2 | 9 | 2 | 6 | 3 | 6 |
| • DEPRESSED RAIL/TRANSIT, ARTERIAL STREET EAST | - | FH-2 | | | | | | | | |
| - with minimum grade adjustments, all tracks | SC-1 | - | 2 | 3 | 2 | 9 | 2 | 9 | 3 | 9 |
| - with Orange Line in tunnel to Dartmouth Street | SC-2 | - | 2 | 6 | 2 | 9 | 2 | 9 | 3 | 9 |
| - with Forest Hills Station elevated (option) | - | FH-2a | 2 | 3 | 2 | 9 | 2 | 6 | 3 | 6 |
| - with Arterial to Jackson Square only (2 options) | - | FH-2b,2c | 2 | 3 | 2 | 9 | 2 | 9 | 3 | 9 |
| • RAIL/TRANSIT ON MODIFIED EMBANKMENT, NO ARTERIAL STREET | - | FH-3 | | | | | | | | |
| - with minimum grade adjustments for all tracks | SC-1 | - | 2 | 3 | 2 | 0 | 2 | 0 | 2 | 6 |
| - with Orange Line in tunnel to Dartmouth Street | SC-2 | - | 2 | 6 | 2 | 0 | 2 | 0 | 2 | 9 |
| • RAIL/TRANSIT ON MODIFIED EMBANKMENT, ARTERIAL CROSSING EAST TO WEST | - | FH-4 | | | | | | | | |
| - with minimum grade adjustments, all tracks | SC-1 | - | 2 | 3 | 2 | 0 | 2 | 0 | 2 | 6 |
| - with Orange Line in tunnel to Dartmouth Street | SC-2 | - | 2 | 6 | 2 | 3 | 2 | 3 | 2 | 9 |
| - with Arterial to Jackson Square only (2 options) | - | FH-4a,4b | 2 | 3 | 2 | 0 | 2 | 0 | 2 | 6 |
| • MODIFIED-DEPRESSED RAIL/TRANSIT, ARTERIAL STREET EAST | - | FH-5 | | | | | | | | |
| - with minimum grade adjustments, all tracks | SC-1 | - | 2 | 3 | 3 | 0 | 2 | 9 | 4 | 0 |
| - with Orange Line in tunnel to Dartmouth Street | SC-2 | - | 2 | 6 | 3 | 0 | 2 | 9 | 4 | 0 |
| • MODIFIED-DEPRESSED RAIL/TRANSIT, NO ARTERIAL SOUTH OF JACKSON SQUARE | - | FH-6, 6a | | | | | | | | |
| - with minimum grade adjustments, all tracks | SC-1 | - | 2 | 3 | 3 | 0 | 2 | 3 | 4 | 0 |
| - with Orange Line in tunnel to Dartmouth Street | SC-2 | - | 2 | 6 | 3 | 0 | 2 | 3 | 4 | 0 |

NOTE: 1. Total project time assumes railroad service on Midland Branch during construction.
2. If railroad service is to be maintained to Back Bay Station, assume a temporary trestle and add 15 months to all project times.

### 5.2.4 Construction Costs (Fig. V-14)

Existing data provided the basis for development of alignment plans and working cross-sections from which all quantities were estimated for pricing. The estimated quantities contain sufficient work-item breakdown (e.g. excavation, embankment, concrete, bridges, walls, transit and railroad track, signals and communications, transit power, completely operational transit and railroad stations, noise attenuating devices, arterial street paving, curb, sidewalks, bicycle paths, street lighting, traffic signals, roadside beautification, utility, relocations, project fencing, maintenance and protection of traffic) to generate an estimated cost of sufficient detail, depth and accuracy.

The unit prices, applied to the estimated quantities, are a reflection of the latest bidding on similar types of construction in this general geographic area. The unit prices further reflect the intricacies and complexities of this project.

All estimated costs are expressed in 1976 dollars and no provisions are made for future escalation. The total construction costs do, however, contain a thirty-percent (30%) add-on to cover contingencies and engineering.

Property-acquisition costs are not included in the cost estimates. Costs for the relocation of public utilities such as water, sewer and storm drains are included in estimates. However, relocation costs for private utilities such as gas, telephone and electric power have not been included in estimates.

NOTES TO TABLE (FIG. V-14)

(1) Deduct $26,828,000 from Rail/Transit Cost; deduct $785,000 from Street Cost.
(2) Deduct $26,828,000 from Rail/Transit Cost; deduct $1,367,000 from Street Cost.
(3) Deduct $4,012,000 from Street Cost.
(4) Deduct $6,787,000 from Street Cost.
(5) Does not include $7,625,000 for South Cove Project Cost west of Massachusetts Turnpike Station 313+00 to Station 322+00.
(6) All costs are expressed in 1976 dollars.

General Notes

(7) The demolition of the Existing Orange Line from Forest Hills to the South Portal add to the total cost $1,440,000.
(8) All estimates assume utilization of an upgraded Midlands Branch Railroad which construction cost of $16,000,000 is not included, since it is the subject of a previous capital grant.
(9) If Commuter Rail service is to be maintained to Back Bay station, a trestle cost of $69,710,000 must be added to all estimates (cost includes engineering and contingencies).
(10) Street work includes all arterial streets, street bridges, miscellaneous street work and streets around stations.
(11) Rail Bridge demolition and new rail/transit and street bridge construction included in rail/transit cost.
(12) Cost Estimates do not include land takings.
(13) Operating costs for all options are similar.

(FIG. V-14)

ALTERNATIVE CONSTRUCTION COSTS

| COMBINED ALTERNATIVES | ALTERNATIVE DESIGNATION | | ESTIMATED CONSTRUCTION COST | | | | |
|---|---|---|---|---|---|---|---|
| | South Cove to Camden St. | Camden Street to Forest Hills | South Cove to Camden Street<br>Rail/Transit | Camden St. to Forest Hills<br>Rail/Transit | South Cove to Forest Hills<br>Street Work | 30% Engineering & Contingencies | Total Alternative Cost |
| • NO BUILD RAIL/TRANSIT | NB-1 | NB-1 | | | | | |
| • DEPRESSED RAIL/TRANSIT, NO ARTERIAL STREET | - | FH-1 | | | | | |
| - with minimum grade adjustments, all tracks | SC-1 | FH-1 | (5) $ 45,198,000 | $ 222,897,000 | $ 9,124,000 | $ 83,466,000 | $ 361,685,000 |
| - with Orange Line in tunnel to Dartmouth Street | SC-2 | FH-1 | 63,516,000 | 222,897,000 | 9,199,000 | 88,684,000 | 384,296,000 |
| - with Forest Hills Station elevated (option) | - | FH-1a | - | (1) | (1) | - | |
| • DEPRESSED RAIL/TRANSIT, ARTERIAL STREET EAST | - | FH-2 | | | | | |
| - with minimum grade adjustments, all tracks | SC-1 | FH-2 | (5) 45,198,000 | 222,897,000 | 17,455,000 | 85,665,000 | 371,215,000 |
| - with Orange Line in tunnel to Dartmouth Street | SC-2 | FH-2 | 63,516,000 | 222,897,000 | 17,530,000 | 90,883,000 | 393,826,000 |
| - with Forest Hills Station elevated (option) | - | FH-2a | - | (2) | (2) | - | |
| - with Arterial to Jackson Square only (options) | - | FH-2b, 2c | - | - | (3) | - | |
| • RAIL/TRANSIT ON MODIFIED EMBANKMENT, NO ARTERIAL STREET | - | FH-3 | | | | | |
| - with minimum grade adjustments for all tracks | SC-1 | FH-3 | (5) 45,198,000 | 75,651,000 | 5,634,000 | 37,945,000 | 164,428,000 |
| - with Orange Line in tunnel to Dartmouth Street | SC-2 | FH-3 | 63,516,000 | 75,651,000 | 5,709,000 | 43,463,000 | 188,339,000 |
| • RAIL/TRANSIT ON MODIFIED EMBANKMENT, ARTERIAL CROSSING EAST TO WEST | - | FH-4 | | | | | |
| - with minimum grade adjustments, all tracks | SC-1 | FH-4 | (5) 45,198,000 | 75,273,000 | 16,388,000 | 41,028,000 | 177,787,000 |
| - with Orange Line in tunnel to Dartmouth Street | SC-2 | FH-4 | 63,516,000 | 75,273,000 | 16,463,000 | 46,576,000 | 201,828,000 |
| - with Arterial to Jackson Square only (options) | - | FH-4a, 4b | - | - | (4) | - | |
| • MODIFIED DEPRESSED RAIL/TRANSIT, ARTERIAL EAST | - | FH-5 | | | | | |
| - with minimum grade adjustments, all tracks | SC-1 | FH-5 | (5) 45,198,000 | 126,179,000 | 20,445,000 | 57,547,000 | 249,369,000 |
| - with Orange Line in tunnel to Dartmouth Street | SC-2 | FH-5 | 63,516,000 | 126,179,000 | 20,520,000 | 63,065,000 | 273,280,000 |
| • MODIFIED DEPRESSED RAIL/TRANSIT, NO ARTERIAL STREET SOUTH OF JACKSON SQUARE | - | FH-6 | | | | | |
| - with minimum grade adjustments, all tracks | SC-1 | FH-6, 6a | (5) 45,198,000 | 122,693,000 | 18,479,000 | 55,911,000 | 242,281,000 |
| - with Orange Line in tunnel to Dartmouth Street | SC-2 | FH-6, 6a | 63,516,000 | 122,693,000 | 18,554,000 | 61,492,000 | 266,193,000 |

### 5.2.5 Construction Impacts

#### 5.2.5.1 Movements of Materials and Equipment

The impacts upon the project area due to the movement of materials and equipment would be diverse in severity and duration. By following an outline of the construction phasing the impacts can be predicted.

In order to facilitate the readers understanding of what is being compared, the project has been divided into two sections. One section would be from South Cove to Camden Street designated SC and the other, Camden Street to Forest Hills designated FH.

A major impact on the entire project site will be caused by the number of workers going to and from the job site and the parking required in the immediate area. In areas south of Ruggles Street where clearance is extensive, parking will be easily accommodated.

Alternative SC-1 South Cove to Camden Street with Minimum Grade Adjustment to all Tracks.

Local Streets which now bridge over the railroad right-of-way between South Cove and Camden Street would be replaced due to new rail/ transit width requirements (Dartmouth Street, Berkeley Street, Clarendon Street, Columbus Avenue, Massachusetts Avenue and West Newton Street, and would be reconstructed while the rail line was still in service. Steel members for these structures would be shipped by rail to the site but all other materials would be transported by truck on local streets.

Materials for the drainage within the rail/transit facility would be trucked over local streets as would the power and signal system equipment.

The materials needed to lay the tracks would be brought in by rail. Stock piled in lands that are currently cleared and owned by MBTA and DPW. They would include ballast, ties and the 1,500 foot sections of welded rail. The transportation of the material would not have a significant effect on the rail/transit corridor - as there would be no regularly scheduled traffic in the rail corridor at that time.

Alternative FH-1 Depressed section without Arterial Street

In order to construct this alternative, the existing embankment between Camden Street and Forest Hills would need to be removed and the proposed 3.2 mile long depressed section excavated. The removal from the project site of the resultant spoil would be accomplished by utilizing the existing rail facilities. At a location midway between Camden Street and Forest Hills, removal of the embankment would begin. The tracks would be removed for a short section and as the embankment was removed it would be loaded onto godola cars and transported by rail out of the area. After the initial delivery of earth moving equipment into job area via local streets, the impact of this phase of the operation would be limited to the noise and air pollution impacts associated with that movement.

Much material and equipment would be delivered to the job site by rail and distributed along the rail bed as required. However, some items, concrete for example, would be delivered in ready-mix trucks via the Southeast Expressway, Segment# 1 and Columbus Avenue. The impacts brought about by this phase of the operation include the air pollution and noise associated with heavy trucking in addition to short term traffic congestion and the physical damage done to surface of the local streets.

Removal of the existing structures over the local streets would be done as the embankment removal progressed. The steel girders, ties, granite block abutments and walls would be transported out of the area via rail with its accompanying adverse impacts.

Following the construction of the depressed section, bridges would be constructed at the location where local streets previously crossed under the embankment section. The materials needed for these structures; steel, concrete, bridge railings, fencing, etc., would be delivered via local streets with the previously mentioned adverse impacts. Heavy duty cranes would be moved into the project area for setting of the steel members across the depressed section.

Utilities which were located in the local streets beneath the embankment section would, in the future, be carried in the utility bays of the local street bridges over the depressed facility or located beneath the depressed facility. Materials for these relocations would be transported to the project area by truck over local streets.

Stations, which can be constructed independent of the rail, would be constructed following the completion of the depressed section. All the materials used in the construction of the station; concrete, steel, glass, electrical material, plumbing materials, turnstyles, etc., would be delivered by trucks over the local streets.

<u>Alternative FH-2</u> Depressed Section with Arterial Street

The impacts of the movement of materials and equipment in the project area for Alternative FH-2 will be the same as Alternative FH-1 for the rail/transit facility section. The arterial street, which would be scheduled for construction after the rail/transit facility, would require earth-moving and paving equipment for its construction. It is not anticipated that the arterial street would require great amounts of earth moved in or out of the project site, therefore, after the initial delivery of the heavy equipment to the site, the transporting of the roadway subbase materials, bituminous material and the landscaping materials will make up the major movement of materials into the area. The impacts will be the air pollution, noise, disruption of traffic and damage to local street surfaces attributed to those movements.

<u>Alternative SC-2</u> South Cove to Camden Street with Orange Line in Tunnel to Dartmouth Street

Alternative SC-2 would feature a cut and cover tunnel from a point west of Arlington Street to a point west of Dartmouth Street. The remainder of the section to Camden Street is similar to SC-1.

The excavation for the tunnel section would be done in a manner similar to FH-1 and FH-2 with the spoil material transported out by rail. The vast amounts of concrete needed to construct the tunnel would be delivered by ready-mix trucks via the Southwest Expressway, Segment# 1 and Columbus Avenue. The construction impacts would be those associated with a high frequency of trucks moving into and out of the job site.

<u>Alternative FH-3</u> Embankment Section without Arterial Streets

The major difference between Alternative FH-3 and Alternatives FH-1 and FH-2 is that section between Camden Street and Forest Hills, which will be improved embankment. The existing embankment will be raised and widened, existing bridges removed and replaced, cross streets reconstructed, new rail/transit trackage laid and new stations built under this Alternative.

The construction procedures for Alternatives FH-3 and FH-4 would be very similar to Alternative FH-1 and FH-2. The major difference being the fill being transported into the project area under this Alternative compared to the spoil being transported out under Alternatives FH-1 and FH-2. Impacts will be less severe due to the smaller amount of earth being transported and by the relative lack of concrete needed under Alternative 3.

Alternative FH-4 Embankment Section with Arterial Street

The impacts brought about by the movement of materials and equipment under this Alternative are the same as Alternative FH-3 along with the arterial street impacts from Alternative FH-2.

Alternative FH-5 Modified Depressed Rail/Transit Arterial Street from Ruggles Street to Forest Hills

Construction of the alternative would require the excavation of significant amounts (1.6 million cubic yards estimated) of material which forms the existing railroad embankment. Of this excavation, approximately 35 percent (.5 million cubic yards) would be transported off the site as unsuitable material. The remaining material (1.1 million cubic yards) would be placed as new embankments where required.

The construction procedures for this alternative are very similar to those of Alternative FH-2. The impacts of the movements of materials and equipment would be similar but less severe than that of Alternative FH-2.

Alternative FH-6 Modified Depressed Rail/Transit Arterial Street from Ruggles Street to Jackson Square.

Construction of this alternative would be similar to that of Alternative FH-5. Under the alternative, however, the arterial street would not be constructed between Jackson Square and Forest Hills. The impacts of the movement of materials and equipment needed to construct this alternative would be slightly less severe as those of Alternative FH-5.

5.2.5.2 Spoil Disposal

For the Embankment, Depressed and Modified Depressed alternatives, a large amount of debris (concrete from demolished bridges, walls) would need to be disposed of. Additionally, for the fully Depressed Alternative some 3,000,000 cubic yards of dirt, rock and granite blocks would require disposal.

The deposition of this material is discussed more specifically in Section 6.2.2.2.

5.2.5.3 Interruption of Utility Services

The Southwest Corridor alignment from South Cove to Forest Hills is crossed by a number of utility lines such as gas pipes, water pipes, power conduits, telephone ducts, storm drains and sanitary sewer lines. These utilities, with the exception of Stony Brook Conduit, generally cross the Corridor alignment along the present street crossings of the Penn Central railroad.

Among the various rail/transit alternatives considered, the depressed or modified depressed alternatives, be relocated onto structures integral with bridges spanning the cut or would be placed on individual structures as found necessary or desirable in the final design.

The smaller utility lines could cross the depressed alternative in the utility bays of the bridges that would replace the existing street crossings.

Continuity of utility services, during construction of each particular bridge, would be provided by temporarily relocating them in the immediate vicinity.

Storm and sanitary sewers that must cross the depressed alternative would be siphon crossings placed beneath the tracks. Siphons would be multi-barrel type with suitable emergency valves and clean-out chambers to facilitate their proper operations and maintenance. Where it is possible, adjacent storm drains or sanitary sewers would be consolidated or grouped together so that they cross the rail/transit tracks at a single location.

In the "modified embankment" alternative, utility relocations, in general, would be required only where they would interfere with the extension and construction of overpasses and stations. In such cases utility lines would be relocated temporarily to ensure continuity of their services until their permanent relocations are completed.

Reinforcing of some utilities adjacent to the wider embankment would probably be required. Reinforcement of Stony Brook Conduit lying under the proposed Arterial Street may be necessary.

Stony Brook Conduit

The Stony Brook Conduit, which runs along the Corridor, begins in the Hyde Park area and extends through Roslindale, Jamaica Plain, and Roxbury before it outfalls into the Back Bay Fens Pond through the sluice gates at Boston Gate House No. 1, and into the Charles River Basin via the 12' x 12' Foul Flow Channel.

The original purpose of the Stony Brook Conduit, constructed in the 19th Century and partially improved in the early nineteen hundreds, was to contain the Stony Brook flood water and alleviate flooding conditions within the approximately 9,000 acres of the Stony Brook watershed. However, along its entire length, the conduit is connected to a number of existing sanitary sewers including the Stony Brook Valley Sewer, and the West Roxbury Low Level Sewer, thus permitting sanitary sewage to be discharged into the conduit. The conduit is, therefore, considered a combined system conveying both storm and sanitary flows.

The Stony Brook conduit crosses the Southwest Corridor alignment at Forest Hills and Roxbury Crossing area. The Corridor alignment is also crossed by the Old Stony Brook Double Channels at the Ruggles Street crossing.

Forest Hills Crossing

The Conduit at its Forest Hills crossing is an oval shaped, 17'-0" x 13'-9" concrete conduit constructed in 1911. Its invert elevation, where it presently crosses the Corridor alignment, is about 10' ± (U.S.G.S. Datum). The invert elevation for the Conduit crossing under the "depressed" alternative is estimated about -5. Relocation of the conduit, in this alternative, therefore,would be accomplished by a siphon appropriately designed so that it will be hydraulically efficient and self-cleaning. If hydraulic calculations prove it to be necessary, a pumping facility would be installed to assist the siphon operation and to prevent any flooding in emergency situations.

In the "modified embankment" alternative, no relocation of the Stony Brook Conduit at this crossing would be necessary. However, examination during the design phase of the project of its structural reliability may prove to be deficient, in which case it will be either relocated or structurally strengthened.

Roxbury Crossing

The Conduit at its Roxbury crossing is an oval shaped, 17'-0" x 15'-6" sized concrete structure constructed in 1888. In this area the Conduit not only crosses the Corridor, but also runs parallel to and beneath the proposed rail/transit tracks and station for approximately 700 feet.

In the depressed or modified depressed alternatives, this relocation, where it crosses the tracks, would be a siphon crossing similar to the Forest Hills crossing and assisted by a pumping facility if necessary.

In the "modified embankment" alternative, this portion of the Conduit will be relocated also. Its relocated length will depend on its structural sufficiency, which will be determined during the design phase of the project.

Ruggles Street Crossing

Another major crossing of the Corridor is located at the Ruggles Street, where the Old Stony Brook Double Channels cross the existing Penn Central railroad. This crossing presently consists of two large size branches. One branch is of brick, constructed in 1886, and the other branch is of concrete, constructed in 1909.

In the depressed alternative, the relocation will consist of constructing an appropriately sized siphon at each crossing.

For the modified embankment alternative a siphon would not be required.

5.2.5.4 Traffic Flows

Traffic flow in the study corridor would be disruptive under all alternatives but to a varying degree of severity.

Alternative SC-1 South Cove to Camden Street with Minor Grade Adjustments for all Tracks

The third construction contract, Camden Street to Arlington Street would be phased to dovetail into the progress of the second construction contract. There could be no disruption of the rail service until the major portion of earth moving has been completed in the preceeding contract.

The phase of this contract which would be disruptive to traffic would be the replacment of the local street bridges over the proposed rail/transit right-of-way. The structures to be reconstructed in this contract are: Berkeley Street, Columbus Avenue, Clarendon Street, Dartmouth Street and Massachusetts Avenue. Buckingham Street which runs parallel to and south of the Penn Central right-of-way between Clarendon Street and Dartmouth Street will be replaced and would be reconstructed completely on structure.

The replacement of the structures in the third contract would be scheduled to suite the local street pattern. Berkeley Street would be closed to traffic and traffic rerouted to Columbus Avenue and Arlington

Street. (With the assumption Arlington Street has been replaced under the South Cove Tunnel extension contract).

While Berkeley Street was being reconstructed, the replacement of Dartmouth Street would begin. Traffic would be rerouted to Clarendon Street and Columbus Avenue. Clarendon Street would be temporarily made two-way between Columbus Avenue and Boylston Street.

Massachusetts Avenue, which, with the exception of West Newton Street, is somewhat isolated relative to any interaction with the other structures being replaced, would be scheduled for replacement independent of the structure replacement in the Back Bay Station area. The one controlling factor is that rail service to the excavation area in contract 2 must be maintained. Massachusetts Avenue would be closed to traffic, West Newton Street temporarily made two-way between Huntington Avenue and Tremont Street and a temporary grade-crossing established at Gainsborough Street/Camden Street and the railroad. Rail traffic at this location would be restricted to that time when construction is in progress in the second contract. Crossing guards would be required during those hours. The West Newton Street structure would be reconstructed subsequent to the Massachusetts Avenue reconstruction. West Newton Street would be closed with traffic being rerouted to Massachusetts Avenue.

Subsequent to the completion of the Dartmouth Street structure the combined structure of Clarendon Street, Columbus Avenue and Buckingham Street would be closed to traffic and dismantled. Traffic would be rerouted from Columbus Avenue to Dartmouth Street and Stuart Street. Berkeley Street would be temporarily made two-way between Boylston Street and Tremont Street. Appleton and Chandler Streets could handle rerouted traffic as well as Dartmouth Street.

<u>Alternative SC-2, South Cove to Camden Street with Orange Line in Tunnel to Dartmouth Street.</u>

Construction of this alternative would create traffic flow disruption similar to those of SC-2.

<u>Alternative FH-1</u> Depressed Rail/Transit, No Arterial Street

Construction of this alternative would create traffic flow disruptions throughout the length of the project. The major problem areas will occur from Ruggles Street south to Forest Hills due to the elimination of the existing embankment section and construction of a depressed section.

The Ruggles Street to Forest Hills section would be broken into two construction contracts with the contractors beginning at a common point and working away from each other utilizing the existing railroad to transport the spoil material away from the area.

The removal of the embankment would preceed by a significant margin the excavation of the depressed section due to the preparation required and the method of excavation. Therefore, the embankment would be removed, the structures dismantled and the local cross streets left open. As the excavation of the depressed section proceeds, each street would be closed, the concrete shell of the depressed section constructed and subsequently the new local street bridge erected.

With the first contract extending from Forest Hills to a point midway between Boylston Street and Mozart Street, the traffic patterns would be as follows:

Boylston Street would be closed to traffic which would be rerouted to Mozart/Atherton Street and Green Street. As construction

proceeds southerly, Green Street would be closed and traffic rerouted to Williams Street and Mozart/Atherton Street. Following Green Street, Williams Street would be closed with traffic being rerouted to McBride Street and to Boylston Street which would now be open to traffic. Proceeding southerly, McBride Street would be closed, but it would be unadvisable to keep Williams Street closed concurrently with McBride Street, therefore, a temporary structure would be erected at Williams Street until such time as the permanent McBride Street structure would be open for traffic.

Morton Street East and Morton Street West, under Alternative FH 1, would be constructed as a divided roadway and bridge north of the Arborway.

East Morton Street would remain open and handle two-way traffic until relocated Morton Street was built and opened to traffic. East Morton Street would then be abandonned to become part of the proposed Forest Hills Station complex.

Work on the second contract which begins at the northerly limit of the first contract and extends to Camden Street would begin approximately 3 months after the start of the first contract with the following temporary traffic pattern changes.

Mozart Street would be closed with traffic rerouted to Boylston Street. Excavation would continue north to Centre Street which would be closed with traffic being rerouted to Heath Street. A temporary bridge would be erected at Centre in order to service this major traffic corridor. Heath Street would be closed and traffic rerouted to New Heath Street and to the temporary bridge at Centre Street. The excavation would continue northward to New Heath Street which would not be closed until the Heath Street bridge has been built and open to traffic. The excavation for the depressed section would continue north to Tremont Street. When Tremont Street is closed to traffic a temporary detour road would be required to link Tremont Street to Station Street on the west side of the tracks. Station Street would temporarily be widened to accommodate the additional traffic diverted from Tremont Street. Excavation would be continued north of Station Street to Prentiss Street which would be closed to traffic. Traffic would be routed back to Station Street. Proceeding north, Ruggles Street would be the next cross-street to be closed to traffic. Due to the importance of this street coupled with the fact that it is somewhat isolated, there would be a detour road built along the westerly side of the existing right-of-way and a temporary crossing constructed north of Ruggles Street. This would remain in service until the proposed Ruggles Street crossing was open to traffic. Following the construction of the Prentiss Street structure, work would begin on the Station Street structure with traffic being diverted to Prentiss Street.

Alternative FH-2. Depressed Rail/Transit, Arterial Street East

Construction of this alternative would create all of the traffic flow disruptions as would be created under alternative FH-1 in addition to those which would be caused by the Arterial Street.

Segment 2 Arterial Street

Assuming the rail/transit facility was constructed first and all the cross streets were reconstructed to permanent line and grade, it would be necessary to construct a detour road parallel and east of the proposed Arterial Street from Ruggles Street to Jackson Square. Upon completion of the detour road, traffic would be rerouted from Tremont Street and Columbus Avenue to the detour road.

The traffic on the cross streets between Ruggles Street and Jackson Square would function freely while the Arterial Street was being constructed. As each cross street was being tied into the Arterial Street there would be some short term closings but this would be done with only minor disruptions to traffic. Upon completion of Segment 2 of the Arterial Street, traffic will be transferred to the Arterial Street from Ruggles Street to Jackson Square.

Segment 3 Arterial Street

Segment 3 of the Arterial Street will not involve any detour roads. Reconstruction of the cross street and any relocation of local streets would be done prior to the construction of the Arterial Street. The entire length of Segment 3 would be constructed before any section of it would be opened to traffic. Closing of the cross streets to traffic would occur only when each street was being tied into the Arterial Street and would be of short duration.

Alternative FH-3. Embankment Section, No Arterial Street

The same construction contract limits used in the Alternative FH-1 will be used for Alternative FH-3. The alternative necessitates the raising and widening of the present embankment, the dismantling of existing bridges over local streets, the construction of new bridge abutments, and retaining walls, the building of new rail/transit stations, the erection of new rail/transit bridges over local streets and the laying of new trackage.

The traffic patterns for Alternative FH-3 during construction would be as follows:

Boylston Street would be closed to traffic during the construction of the bridge over Boylston Street and traffic would be detoured to Mozart/Atherton Street and Green Street. Green Street would be closed to traffic following the completion of the structure at Boylston Street and traffic would be rerouted to Boylston Street and Williams Street. Following the completion of the structure over Williams Street, McBride Street will be closed to traffic which would be detoured to Williams Street. Morton Street, which consists of two roadways separated by the Arborway could be reconstructed independently of the other cross streets. Morton Street East would be made two-way, Morton Street West would be excavated and the proposed relocated Morton Street built north of the Arborway. Following the opening of the relocated Arborway, Arborway East would be abandoned and become part of the Forest Hills Station complex.

The second construction contract would begin immediately after Boylston Street was re-opened for traffic. The construction of the bridges in this contract would create no particular problem in re-routing of traffic. The structures would be replaced in the order of Mozart/Atherton Street, Centre Street, Heath Street, New Heath Street, Tremont Street, Station Street, Prentiss Street, and Ruggles Street. The only restriction being that a street must be open for traffic prior to the next one being closed.

Alternative FH-4. Rail/Transit on Modified Embankment
Arterial Street Crossing East to West

The impacts upon traffic flow caused by the construction of the rail/transit facility under Alternative FH-4 would be identical to those under Alternative FH-3. The impacts upon traffic caused by the construc-

tion of Segment 2 of the Arterial Street would be identical with those described in Alternative FH-2.

Segment 3 Arterial Street crossing East to West. The reconstruction of the cross streets and relocation of local streets in the area would be done prior to the beginning of the Arterial Street construction. The Arterial Street would be constructed without disruption to the local traffic except for short term closing of the cross streets when the Arterial Street was being tied into the cross streets. Traffic would be allowed on the Arterial Street only when it was completed.

Alternative FH-5 Modified Depressed Rail/Transit

Alterial Street - Ruggles Street to Forest Hills

Construction of this alternative would create traffic-flow disruptions throughout the length of the project. The major problem areas will occur from Ruggles Street south to Forest Hills due to the elimination of the existing embankment section, the construction of a depressed section and the reconstruction of the local cross streets.

The Ruggles Street to Forest Hills section would be broken into two construction contracts, with the contractors beginning at a common point and working away from each other. The existing railroad would be used to transport spoil material.

Existing track bridges would be dismantled. Tracks, ties and ballast would removed. The embankment material regraded to the proposed finished grade. Excavation for the concrete shell of the modified depressed section would follow and local cross streets closed for construction as scheduled.

Construction of the first contract (Mozart Street to Forest Hills) includes new crossings which are being proposed at Gordon Street and at Lorene Place. Construction at these two locations would begin at the initial stages of the contract. Boylston Street would be closed. Traffic would be rerouted to Mozart/Atherton Street. McBride Street would be closed and its traffic rerouted to Williams Street.

Morton Street East and Morton Street West would be constructed as a divided roadway and bridge north of the Arborway. East Morton Street would remain open and handle two-way traffic until relocated Morton Street was built and opened to traffic. East Morton Street would then be abandonned to become part of the proposed Forest Hills Station complex.

Following the construction of Gordon Street and Lorene Place, traffic would be routed to them. Green Street would be closed for construction. When construction of McBride Street was finished, it would be opened to traffic. Williams Street would be closed for construction.

Work on the second contract (begins at the northerly limit of the first contract and extends to Camden Street) would begin approximately three months after the start of the first contract. The following temporary traffic-pattern changes would pertain:

Mozart Street would be closed and its traffic rerouted to the reconstructed Boylston Street. Construction would continue north to Centre Street which would be closed. Its traffic would be rerouted to Heath Street and New Heath Street. Construction of a new crossing to be introduced at Cedar Street would begin at the initial stages of the contract. Tremont Street would be closed for reconstruction with traffic being rerouted to Station and Prentiss Street. A detour road north of the Ruggles Street Station would be constructed and Ruggles Street closed for reconstruction. Following the opening to traffic of the newly constructed Mozart Street,

Centre, Cedar, Tremont, Ruggles, and Heath Streets would be closed for reconstruction. Station Street and Prentiss Street would be dead-ended at the right-of-way line and the detour road at the Ruggles Street Station would be removed.

The arterial street (Ruggles Street to Jackson Square) being proposed in conjunction with Alternative FH-5 would be treated in a similar way in which it would be handled in Alternative FH-2. There would be one exception: the detour road would have to be built prior to regrading the area outside of the rail/transit concrete section.

Alternative FH-6 Modified Depressed Rail/Transit

Alterial Street - Ruggles Street to Jackson Square

The impact upon traffic flow by Alternative FH-6 would be the same as that for Alternative FH-5. The major difference in the concept of the two alternatives is that the arterial street from Jackson Square to Forest Hills would not be built under Alternative FH-6.

#### 5.2.5.5 Pedestrian Movements

Alternative SC-1 and SC-2

Alternatives SC-1 and SC-2 involve the area from Camden Street to South Cove with 2- to 5-foot grade adjustments for all tracks. There are five local street bridges over the railroad which would be reconstructed under these alternatives. The scheduling of bridge replacemnts may vary depending on many factors. Generally, no adjacent bridges will be worked on concurrently because the traffic pattern needs to be maintained. Pedestrian traffic can be rerouted without difficulty. It would be important to maintain pedestrian traffic at Massachusetts Avenue, which is the first location. To build a temporary crossing adjacent to the bridge site would be extremely difficult due to space restrictions. The best solution would be to build the proposed Massachusetts Avenue structure in two sections. Rerouting pedestrian traffic to adjacent streets would be highly circuitous and inadviseable at this location.

During the reconstruction of Dartmouth Street, pedestrian traffic would be rerouted to Clarendon Street. A temporary pedestrian overpass at Dartmouth Street would not be feasible because of space restrictions and the maze of trackwork below.

While Clarendon Street/Columbus Avenue is closed to traffic, pedestrian traffic would be rerouted to Berkeley and Dartmouth Streets. When Berkeley Street is being reconstructed, traffic would be rerouted to Arlington Street or Columbus Avenue.

Alternatives FH-1 and FH-2 Depressed Rail/Transit

Pedestrian travel across the project during construction would not pose any problems of major proportions. Cross movements at present are restricted to existing local street crossings, at a few isolated pedestrian overpasses and at one pedestrian underpass.

In the first construction contract, which extends from Forest Hills to a point midway between Boylston Street and Mozart Street, there are now seven locations where pedestrians can cross the Penn Central right-of-way. When removal of the embankment begins, the local streets which now cross under the railroad will remain open until excavation for the depressed section approaches that location. At that time, temporary pedestrian overpasses would be erected adjacent to the bridge site. They would remain until such time as the local street bridge is open to pedestrian traffic.

To eliminate a pedestrian crossing in this section, without some type of temporary means of crossing at the same location, would create a hardship for many of the area's residents.

The second construction contract, which extends from the northerly limit of the first contract to Camden Street/Gainsboro Street, has seven locations where pedestrians cross the rail corridor. All of these locations would have temporary pedestrain overpasses erected adjacent to the local street bridge site during the construction of the permanent structure.

Alternatives FH-3 and FH-4 - Rail/Transit on Modified Embankment

Pedestrian Movement across the project corridor during the construction of either of the embankment alternatives would pose no significant problems. Street closings would occur only during the placing of bridge cross members over the local streets.

Alternatives FH-5 and FH-6

Pedestrian movements across the project corridor during the construction of either of the modified depressed alternatives would present serious problems. The problems would be caused by the distance pedestrians would have to travel to cross the corridor as each street was closed. The length of time each street would be closed would be significant due to the major construction involved in rebuilding most of the streets under the modified depressed alternatives. Temporary pedestrian walkways and overpasses would be difficult to introduce at many of the street crossings.

#### 5.2.5.6 Construction Noise

Construction and demolition activities will contribute to high noise levels in the vicinity of the arterial and proposed highway and transit facilities for the estimated three to four year construction period. The actual noise level at any location will depend upon the chosen alternative and the staging of the various construction phases. For example, constructing the transit in a full or modified cut will require extensive piling and dewatering along the entire length of the cut section. In addition, water recharging will probably be needed for structures near to the dewatering areas. If, on the other hand, the transit is built on the existing embankment, much of the sheet piling and water pumping operations will not be required.

The noise created by construction operations is regulated by a number of Federal, State and local laws. The FHWA requires that construction noise be considered in the Environmental Assessment stage of the project. The Federal Highway Program Manual 773 requires the following:

1. Identify land uses or activities which may be affected by noise from construction of the highway. The identification is to be performed during project development studies.

2. Determine the special provisions which are needed in the contract documents to minimize or eliminate adverse construction noise impacts to the community. This determination shall include a weighting of the benefits achieved and the overall adverse social, economic and environmental effects and costs of the special provisions.

3. Incorporate the needed special provisions in the contract documents.

For this project it is estimated that construction noise levels would exceed 67dBA out to a distance of from 400 feet to 800 feet from the construction site, where no buildings intercept the sound waves.

Special provisions to reduce construction noise should include: daytime hour limitations on construction activity; well-muffled equipment; the quietest equipment used in the most sensitive locations. Sonic or vibratory pile drivers could be used for the extensive sheet piling required for the project in areas where settlement is not of concern. Since no acceptable beaming formulas that indicate pile-bearing capacity have as yet been developed for sonic or vibratory drivers, all foundation piling will still require impact-type hammers.

The EPA has recently promulgated regulations requiring that new trucks and air compressors comply with certain noise limits. The new equipment that the contractor owns or rents will necessarily be quieter than the old and should be used on all sensitive locations.

UMTA has no construction noise regulations regarding the construction of a rapid-transit system, but usually relys upon the regulations of other agencies to limit construction noise.

Noise levels at the construction site will also be limited in terms of a worker's exposure to noise. These limits are set by OSHA and presently require that a worker's eight-hour dosage of noise not exceed an $L_{eq}$ of 90dBA.

The Massachusetts Department of Public Health mentions construction and demolition noise in regulation 10.

As a policy matter the Department of Public Health suggests that all equipment be well muffled and that construction be limited to daytime hours.

The Boston Air Pollution Control Commission has specific requlations concerning construction noise. Noise regulations 4 and 6, limit construction noise-levels for various land uses and set a limit of 85dBA at 50 feet for all construction equipment except pile drivers.

In order to estimate construction noise levels, a typical construction scenario for highway and transit projects was used, with appropriate modifications to account for the extensive piling and dewatering which might be required. In all, three different scenarios were considered:

1. The first construction scenario assumed equipment of typical noise level, modified to include extensive piling and dewatering. This would represent the worst-case situation.

2. The second scenario assumed the same equipment-usage factors as the first scenario, but with the quietest available equipment.

3. The third scenario assumes that all equipment complies with the City of Boston Air Pollution Control Commission Noise Regulation 6 and does not include the effects of pile driving, per BAPCC noise regulation 4.

In all of the above cases the eight-hour time average A-weighted sound level, $L_{eq}$, is calculated at 50 feet from the construction site. For the third scenario this value is also converted to an $L_{10}$ sound level based on the results of a highway construction noise survey conducted by the New York State Department of Environmental Conservation. The results of these calculations are as follows:

1st scenario $L_{eq}$ = 93 1/2dBA at 50'
2nd scenario $L_{eq}$ = 85 1/2dBA at 50'
3rd scenario $L_{eq}$ = 90dBA at 50'
3rd scenario $L_{10}$ = 93dBA at 50'

These examples illustrate that construction-noise levels will be quite high and that all reasonable means for reducing construction noise should be employed. It may not be feasible to require all contractors to use only new quieter equipment, but it is reasonable to expect that all equipment should be muffled. The contractor should be required to use newer and quieter equipment in sensitive locations where residences are located very close to the construction site. As seen in the above tables, this could result in an 8dB reduction in construction noise. Nevertheless for residences very close to the site noise levels will be quite high. If a residence is 25 feet from the construction site, the predicted noise level, even with quieted equipment, will be 90dBA.

The data shown on Figure II-24 indicate Leq levels caused by today's railroad operating range from 66 to 78 dBA. In the alternatives which diverts all railroad service, the noise levels would be reduced during periods when construction equipment was not in use.

The situation will be improved somewhat for residences located farther from the construction site. If the distance from site to residence is 100 feet, the predicted $L_{eq}$ will be 89dBA for scenario one and 81dBA for scenario two. At 200 feet, the respective values would be 84 1/2 dBA and 76 1/2 dBA. These predicted levels assume a clear line of sight between the construction site and residence. For the second row of houses, these values will be from 5 to 10dB lower. Consequently, even with quieted equipment and assuming at least one row of houses, construction noise impact will extend out to approximately 400 feet where the $L_{eq}$ will be approximately 67dBA.

#### 5.2.5.7 Air Quality Impacts During Construction

Air-quality impacts associated with construction of this project will consist principally of fugitive-dust emissions associated with excavation and land-fill activities.

Measures to minimize such impacts include contract specifications for handling material in trucks adequately covered by tarpolins, frequent watering to hold down dust, and street cleaning in the work areas.

Total emissions from construction equipment would be insignificant (see Section 6.2.7).

#### 5.2.5.8 Commercial Disruption During Construction

Retail stores on Hyde Park Avenue at Forest Hills will be impacted by construction activity and changes in traffic flow. If a temporary Orange Line station must be built at some distance from the present one, then patronage of these stores may be reduced.

Commercial activities farther south on Washington Street will be affected if traffic flow is interrupted for a lengthy period.

Operations of American Celophane and Hanson Contracting near Green Street may be hampered by restricted access, noise and dust. Similarly, retail activity on Green Street may be affected by construction activity.

J & M Contracting at 267 Amory (if not acquired for right-of-way) will be affected by construction work in close proximity. Industrial activity east of the right-of-way between Atherton and Boylston may be affected by noise and dust, however, access will not be affected in a major way.

A wood frame office/industrial structure at 121 Lamartine Street may be adversely affected by reduced access, noise and dust. Hammond Office Products supply warehouse at Lamartine and Roys Streets would be

somewhat affected by reduced access, noise and dust through the building openings near the construction area. Industrial activities on Amory Street between Dimock Street and Jackson Square would be minimally affected by reduced access, noise and dust.

Dismantling of the Washington Street Elevated will cause temporary interruptions as the structure is removed. Any one segment will only be interrupted for a few days. The traffic flow will be hampered for a substantial period of time. This will increase traffic on Forest Hills, Amory, Lamartine, Call, South and Centre Streets, or on the new arterial if it is constructed between Jackson Square and Forest Hills. Commercial activity on Washington Street will suffer to a small degree from the affect of reduced vehicular traffic during the short demolition period.

#### 5.2.5.9 Inconveniences Due to Rail Service Diversion

During the construction phase, rail service in the corridor could be diverted to the Midland Branch.

While this diversion would greatly simplify the construction procedures for the Project, riders using Midland service would not be able to reach Back Bay directly. See Section 6.2.9.1 for impacts and service alternatives during construction.

Under several alternatives service on the Needham Branch would also be discontinued causing an inconvenience to Needham Center, Roslindale and West Roxbury riders. Section 6.2.9.2 describes service alternatives during construction.

## 5.3 AIR QUALITY IMPACTS

5.3.1 Analysis Objectives. The objectives of the air quality modeling analysis were to evaluate the impacts on community air quality of different project alternatives for both commuter rail operations and the proposed arterial street. The analysis was performed principally on two levels: a macroscale analysis which projected the total area emissions of each pollutant for each strategy and a microscale analysis which determined expected pollutant concentrations at sensitive receptors in the area. The latter study was performed only for carbon monoxide, as hydrocarbon and nitrogen oxide concentrations are intimately related to complex atmospheric photochemical processes. These reactions are more of a regional phenomenon and are, therefore, not readily amenable to analysis of localized ambient air quality impact.

Additional air impacts examined were those associated with parking facilities at the Forest Hills MBTA station, increased electrical power usage on the MBTA Orange Line, and emissions from related land use development in the Southwest Corridor.

5.3.2 Description of Atmospheric Diffusion Model. All predicted carbon monoxide (CO) concentrations for this study were determined using the APRAC-1A urban diffusion model developed at the Stanford Research Institute.[1]* The model simulates CO concentrations from readily available meteorological and traffic data. It is based on the Gaussian plume configuration and incorporates results from several recent research studies[2,3,4]. Emission sources are specified in two forms: a primary network of traffic road segments or links and a secondary grid of area sources. The model calculates pollutant concentrations from diffusion on various scales, ranging from extraurban diffusion of sources in upwind cities to intraurban diffusion of freeway, arterial, and feeder street sources. In addition, a submodel was employed to deal with the helical air circulation typical of street canyons. One-hour average CO concentrations are calculated as a function of time, for comparison and verification with observed concentrations and for operational applications.

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* The model was modified to allow representation of elevated sources.

[1] Mancuso, R.L., and Ludwig, F.L., User's Manual for the APRAC-1a Urban Diffusion Model Computer Program, Environmental Protection Agency, Division of Meteorology, Research Triangle Park, North Carolina, September, 1972.

[2] Johnson, W.B., Dabberdt, W.F., Ludwig, F.L., and Allen, R.J., Field Study for Initial Evaluation of an Urban Diffusion Model for Carbon Monoxide.

[3] Ludwig, F.L., Johnson, W.B., Moon, A.E., and Mancuso, R.L., A Practical Multipurpose Diffusion Model for Carbon Monoxide.

[4] Ludwig, F.L., and Dabberdt, W.F., Evaluation of the APRAC-1A Urban Diffusion Model for Carbon Monoxide.

The computer program VEHEMI was integrated into the model to determine more accurately vehicle CO emission rates. VEHEMI is designed to compute, using EPA methodology, the CO emission rate (grams CO/vehicle mile) for a specified motor vehicle model year mix--in this case, a mix typical of the Boston area--and allows for explicit imput of the ratio of light to heavy-duty vehicles. It replaces an older empirical equation in APRAC-1A that was previously used for this purpose. The method used is based on a procedure outlined by Kircher and Armstrong[1] and incorporates such considerations as deterioration and speed adjustment factors. Also, recent changes in the Federal automobile emission standards related to amendments to the Clean Air Act of 1970 have been incorporated into VEHEMI[2].

5.3.3 Meteorological Factors. It is generally agreed that the meteorological factors directly involved in predicting pollutant concentrations are transport and dilution by the mean wind and dispersal by atmospheric turbulence[3]. These meteorological parameters exhibit important time and space variations, particularly in the lower several thousand feet, where air pollution problems are most acute. The character of the variations in these properties is, in turn, strongly related to the vertical thermal structure of the atmosphere in this boundary layer. During conditions of an unstable atmospheric thermal structure, both horizontal and vertical dispersion of pollutants is enhanced, whereas in stable atmospheres, the reverse conditions apply. Consequently, the thermal stability of the ambient air is an important factor in determining the dispersion properties in a given region.

Another important meteorological parameter is the mixing depth, the vertical thickness of the atmospheric layer in which turbulent mixing can diffuse the emissions. Deeper mixing depths will permit the pollutant to be dispersed into larger volumes, resulting in lower ground-level concentrations. Under certain meteorological conditions, principally low-level temperature inversions, this thickness can be severely limited--thereby trapping the pollutants within a shallow layer near the ground. The mixing depth within a region generally varies both with the season and with the time of day.

Thus, the dispersion properties of the atmosphere at any particular time can be described in terms of the joint occurence of specific conditions of thermal stability, mixing depth, and wind. These meteorological factors are highly interrelated and are observed to occur in combinations of different conditions with varying frequency.

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[1]Kircher, D.S., and Armstrong, D.P., An Interim Report On Motor Vehicle Emission Estimation (Draft), Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina, October, 1972.

[2]Environmental Protection Agency, Compilation of Air Pollutant Emission Factors, Environmental Protection Agency, Office of Air and Water Programs, Publication No. AP-42, Second Edition, Supplement, Research Triangle Park, North Carolina.

[3]Pasquill, F., Atmospheric Diffusion, D. Van Nostrand Company, Ltd., New York, NY, 1962

The APRAC-1A urban diffusion model used in this study to model air quality impacts is designed to be generally applicable to any city where conventional airport weather observations are taken. Airport surface wind speed and direction can be used directly. Special methods were developed to calculate the mixing depth and stability index from the available meteorological observations. The method used for the mixing depth calculation is based on the National Weather Service's 1200 GMT upper air temperature sounding. This sounding, together with the maximum afternoon temperature at the surface permits the afternoon or maximum mixing depth to be calculated. The morning or minimum mixing depth is calculated by using a simple urban model and an empirical relationship involving city size and urban and rural nighttime temperatures. Hourly mixing depths are then interpolated on the basis of the observed hourly surface temperatures for the daylight and pre-midnight hours; mixing depth is assumed to be constant between the hours of midnight and dawn. The method used to determine the stability index depends on prevailing solar insolation and wind speed during daylight hours and on cloud opaqueness and wind speed during nighttime hours.

5.3.4 Traffic Data Base. The urban diffusion model used in this study requires a traffic data base structured on two levels. First, a high-resolution primary network of road segments or links is specified. Imput parameters are the location, length, level of service, and average daily traffic (ADT) for each link. Second, a grid of area sources to handle traffic emissions which do not require a high spatial resolution is defined. Imput here consists of the area and location of the grid squares and the 24-hour vehicle miles traveled (VMT) within each square.

As part of a program to develop a Metropolitan Boston Transportation Control Plan (MBTCP), transportation data were gathered for Boston and the environs included within circumferencial Route 128. The region was divided into three areas corresponding to the inner city and the inner and outer suburbs (see Figures V-15 and V-16). A grid was superimposed upon each of these three areas so that each grid cell contained a uniform density of traffic activities. Thus, the size of the grid used in each area was a function of urban densities and activity concentrations.

The MBTCP study[1] categorizes 1971 and projected 1977 daily VMT (vehicle miles travelled) for each grid cell in the Metropolitan Boston area by facility type (freeway, arterial, collector, and local). Appropriate daily VMT data for 1975, 1980 and 2000 were derived from the projected VMT data in the report for imput as the secondary grid of area sources in the model. The primary grid network (Figure V-17) consisted of average daily traffic volumes and estimates of total peak-hour and 8-hour traffic demand for each link of the primary network. The VMT of the primary link network represented approximately 80 percent of the total daily surface VMT in the project corridor area. The remaining 20 percent was accounted for by secondary area sources.

Traffic volume data were provided for the following cases:

1) Existing (1975) traffic volumes on the existing street network applicable for the no-build condition.

2) Existing (1975) traffic reassigned to reflect a build condition on segment 2 and no-build on segment 3.

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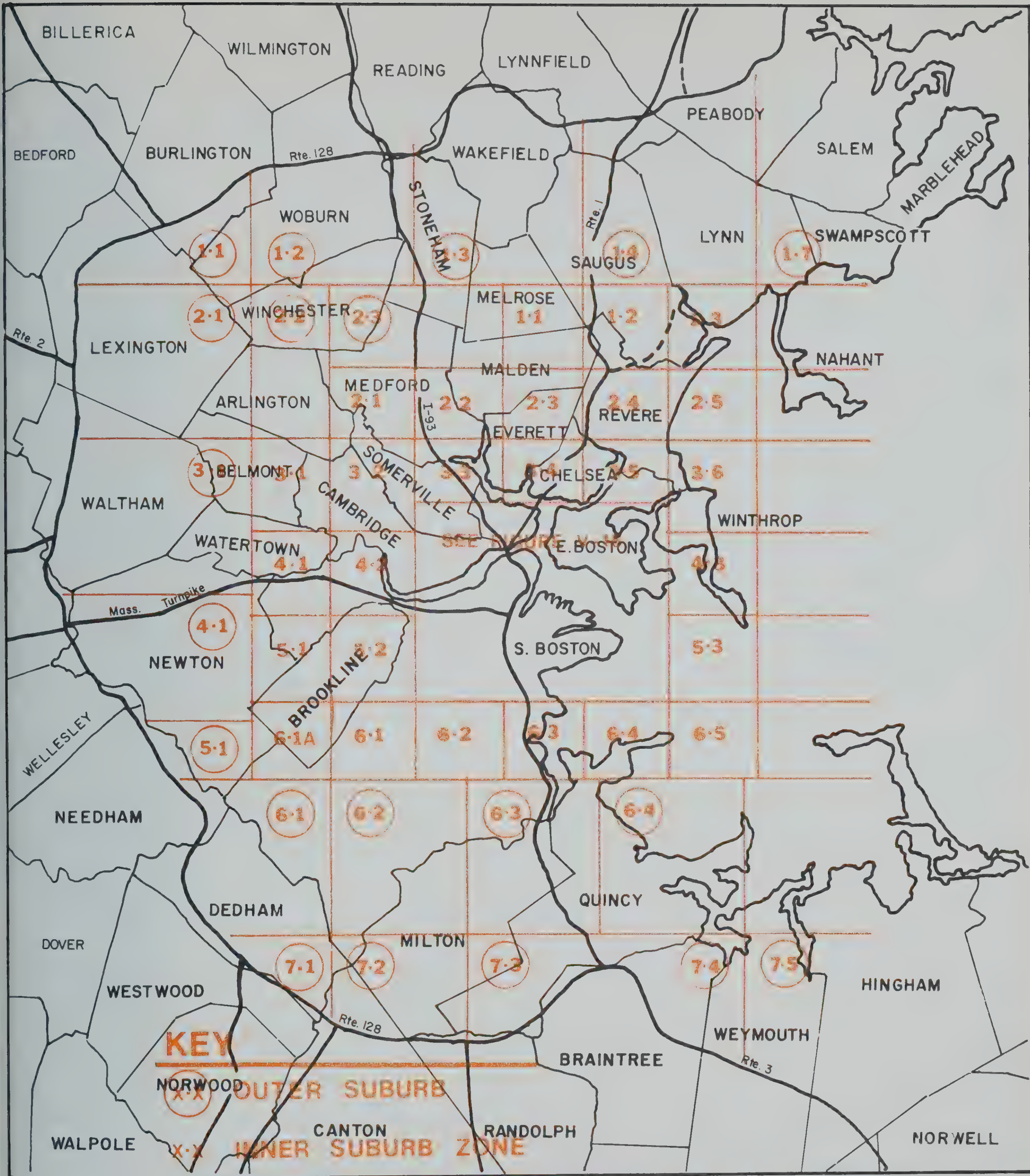
[1] Transportation Controls To Reduce Motor Vehicle Emissions in Boston, Massachusetts, U.S. Environmental Protection Agency Publication No. APTD-1442, December, 1972.




# BOSTON AIR QUALITY STUDY GRID CELL CONFIGURATION

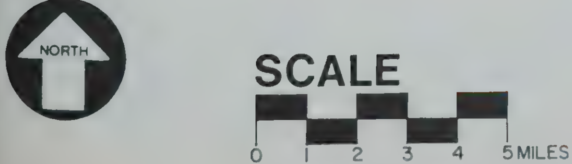



FIGURE V-15


# GRID CELL CONFIGURATION INNER CITY AREA

NORTH

SCALE

0 0.5 1 1.5 2 2.5 MILES

FIGURE V-16

# PRIMARY LINK NETWORK
## NO-BUILD ALTERNATIVE

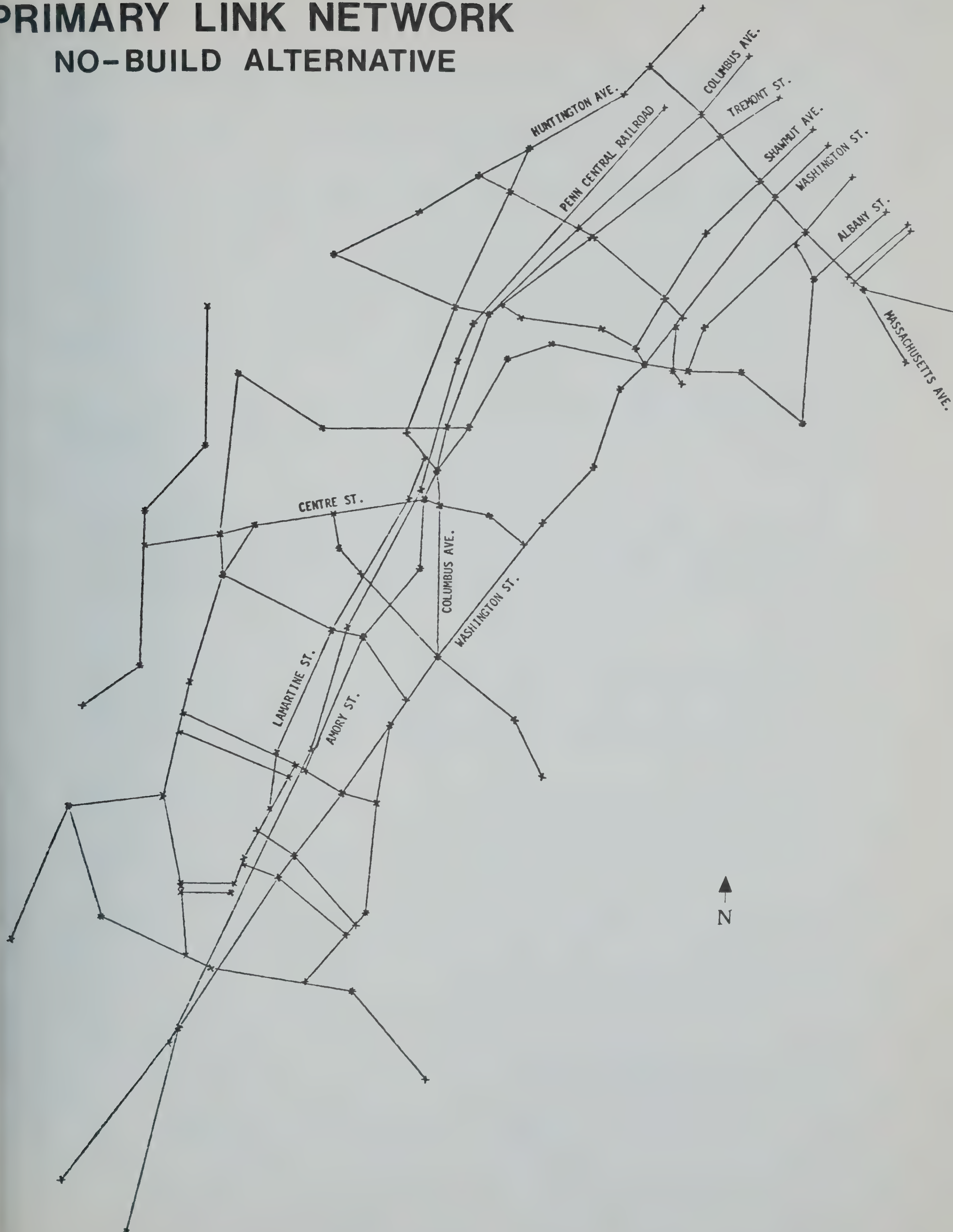



FIGURE V-17

3) Existing (1975) traffic reassigned to reflect a build condition on both segments, 2 and 3.

Appropriate traffic volumes were extracted from these three networks for each of the seven build alternatives evaluated.

Projections of traffic volumes for 1980 reflected a zero growth between 1975 and 1980. This was based on a growth trend between 1964 and 1974 which showed a reduction for certain criterial arterial streets in the Southwest Corridor.

Projections of traffic volumes for 2000 reflect a capacity value for the arterial street segments and no change in volume on other streets.

In addition to the traffic volume data, average peak-hour and 8-hour vehicle speeds and the ratio of light to heavy-duty vehicles in the project corridor were included in the analysis.

A total of four alternatives were considered for the construction and location of the proposed arterial street. Each of the alternatives was analyzed for the years 1975, 1980, and 2000. A brief description of each alternative is as follows:

No Build

<u>Alternatives FH-2b, FH-6</u>

Build only segment 2 of the proposed arterial. This would be a six lane segment extending from Ruggles Street between Tremont Street and Columbus Avenue to Centre Street in Jackson Square. This segment would be located just east of the present Penn Central Railroad Tracks.

<u>Alternative FH-2, FH-5</u>

Build segments 2 and 3 of the proposed arterial. For this alternative, the arterial would be built from Ruggles Street to the present Forest Hills rail station located near the intersection of Washington Street and Hyde Park Avenue. Segment 3 from Jackson Square to Forest Hills would be a four lane segment built just east of the depressed Penn Central railroad.

<u>Alternative FH-4</u>

Build segments 2 and 3 of the proposed arterial. Segment 3 of the arterial would cross the Penn Central rail just south of Atherton Street and be located west of the rail from this point to the Forest Hills rail station. The rail facilities are on a modified embankment in this scheme.

Various alternatives for the railroad and transit system were associated and analyzed with each of the arterial street alternatives. A brief description of each rail/transit alternative is as follows:

A) To leave the existing rail and transit systems as they presently are with the rail on an embankment and the transit elevated on Washington Street.

B) To leave the existing rail on the embankment and to move the transit from Washington Street onto the embankment with the rail.

C) To depress the rail and transit systems below street level where the present rail embankment is located.

Analyses indicated that for each arterial street alternative, the air quality differences between each of these rail/transit alternatives were negligible. This was due to low emissions from the rail and transit systems in relation to the primary link network and to very slight traffic volume differences on the primary network as a result of the three rail/transit alternatives. Therefore, the different rail/transit alternatives are not discussed in the section on the air quality impacts and, concentrations from each of the rail/transit alternatives considered for each arterial street alternative can be considered equivalent. A complete description of each of the arterial streets and the rail/transit alternatives is included elsewhere in the EIA, Environmental Impact Analysis.

Figure V-18 presents projected total VMT for the primary link network for each of the arterial build alternatives and for each of the design years evaluated. Secondary grid VMT by grid were estimated by substracting primary link VMT from total VMT in the grids containing the primary link network surrounding the project corridor. Other grids were not affected by this procedure.

Figure V-18

TOTAL DAILY VEHICLE MILES TRAVELED (VMT), PROJECT AREA PRIMARY LINK NETWORK

| Alternative | | YEAR | |
|---|---|---|---|
| | 1975 | 1980 | 2000 |
| No Build | 482,2666 | 484,986 | 487,706 |
| FH-2b, FH-6 | 481,307 | 484,027 | 495,347 |
| FH-2, FH-5 | 491,016 | 493,736 | 515,565 |
| FH-4 | 489,806 | 492,526 | 513,165 |

5.3.5 Model Validation. For the purpose of verifying the accuracy of a diffusion model in predicting CO concentrations for an area, a model validation exercise is usually performed. This entails modeling the region for CO concentration during several time periods for which on-site CO, traffic, and meteorological measurements are available, comparing the results statistically, and drawing conclusions.

Since an ambient monitoring program was not performed as part of this study, it is not possible to validate the APRAC-1A model for the Southwest Corridor. However, the APRAC-1A model was used recently in two other air quality studies in the Boston area, where model validation was performed. In both of these studies, the model provided CO predictions that were well correlated with CO measurements in the project area, with correlating coefficients in the range of 0.8 to 0.9. These results indicate that APRAC-1A is an accurate state-of-the-art model for predicting ambient CO levels in urban areas, such as the Southwest Corridor.

In the current study, output from the APRAC-1A model was used directly in the analysis. No attempt was made to add a background concentration to the predicted concentrations or to scale the results by a calibration factor. Experience with the APRAC-1A model has shown that both of these factors vary considerably with the average roadway speeds and traffic volumes input to the model. In addition, the traffic data input to the model included area source emissions for background sources in the Boston region.

5.3.6 Macroscale Analysis of Emissions. The quantity of each pollutant released from motor vehicles in the project area for each case was estimated by the computer program VEHEMI, which applies the most recent EPA motor vehicle emission factors to the projected traffic volumes on project area roadways. The emission factors for carbon monoxide (CO), hydrocarbons (HC), and nitrogen oxides ($NO_x$) used in these computations are shown in Figure V-19 distributed by calendar year and pollutant. These factors reflect vehicle mix by model year, weighted travel by age of vehicle, deterioration of control devices as a function of model year and age, the split between light and heavy-duty vehicles on each roadway, and the effect of the BTCP's proposed semi-annual emissions inspection/maintenance program. Rail emissions were extracted from the UMTA report[1] and were assumed not to vary with time.

Estimates of total vehicular emissions of carbon monoxide, hydrocarbons, and nitrogen oxides from the primary link network were prepared for the seven alternatives and for the years 1975, 1980, and 2000. No attempt was made to incorporate emissions from the secondary grid network, as this was based on a general study of the Boston area and uses areawide averages of VMT growth rate and vehicle speed. These data would tend to obscure the detailed changes resulting from the various options which are incorporated into the primary network. Analysis of the motor vehicle emission factors indicates a sharp decrease in emissions from calendar year 1975 to 1980 and 2000. This decrease results from several factors:

> The shift of the vehicle population to newer models will replace the oldest (uncontrolled) segment in the model year mix by newer models (controlled). As an example, CO

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[1] "Characteristics of Urban Transportation Systems," U.S. Department of Transportation, UMTA, May, 1975.

emissions for these controlled vehicles are approximately 96 percent less than those for uncontrolled vehicles.

The implementation of the BTCP's emissions inspection/maintenance program for all light and medium-duty vehicles is expected to reduce all light-duty vehicle CO emissions by 9 percent and HC emissions by 10 percent.[1]

Figures V-20, V-21, and V-22 present, by year, the total annual emissions of CO, HC and $NO_x$ for the various project alternatives. Predicted emission totals for each alternative experience a significant decrease between 1975 and 1980, and 1980 and 2000. These reductions are due to the effects of Federal and BTCP emission controls. Comparison of each of the alternative build projections with the no-build projection for similar time frames indicates that the total emissions of CO, HC, and $NO_x$ from all build alternatives will be up to 3 percent greater than the emissions for the no-build case. This results from the projected increase in total vehicle miles traveled associated with implementation of any of the build alternatives. Comparison of the various build alternatives in future years reveals less than ten percent difference between the projected emissions of CO, HC and $NO_x$. Total emissions for Alternative FH-2b are the lowest of the build alternatives and are approximately equal to the no-build case.

FIGURE V-19

EMISSION FACTORS* FOR CARBON MONOXIDE, HYDROCARBONS, AND NITROGEN OXIDES (IN GRAMS/VEHICLE MILE) FOR CALENDAR YEARS 1975, 1980, 2000

| Calendar Year | CO | | HC | | $NO_x$ | |
|---|---|---|---|---|---|---|
| | Road | Track | Road | Track | Road | Track |
| 1975 | 48.4 | 30.8 | 6.1 | 22.0 | 4.1 | 33.0 |
| 1980 | 22.2 | 30.8 | 2.6 | 22.0 | 2.4 | 33.0 |
| 2000 | 12.9 | 30.8 | 1.6 | 22.0 | 1.2 | 33.0 |

*Assumed vehicle speed is 20 mph, assumed vehicle mix is 5 percent heavy-duty vehicles.

[1] GCA Corporation, Proposed Transportation Control Plan for the Metropolitan Boston Intrastate AQCR, prepared for the Environmental Protection Agency.

Figure V-20

TOTAL EMISSIONS OF CARBON MONOXIDE, HYDROCARBONS, NITROGEN OXIDES FROM PRIMARY LINK NETWORK (100 TONS/YEAR)

| Alternative* | 1975 CO Road | CO Track | CO Total | HC Road | HC Track | HC Total | $NO_x$ Road | $NO_x$ Track | $NO_x$ Total |
|---|---|---|---|---|---|---|---|---|---|
| No Build | 93.6 | .2 | 93.8 | 11.7 | .2 | 11.9 | 7.9 | .3 | 8.2 |
| FH-2b, FH-6 | 93.4 | .2 | 93.6 | 11.7 | .2 | 11.9 | 7.9 | .3 | 8.2 |
| FH-2, FH-5 | 95.3 | .2 | 95.5 | 11.9 | .2 | 12.1 | 8.1 | .3 | 8.4 |
| FH-4 | 95.0 | .2 | 95.2 | 11.9 | .2 | 12.1 | 8.1 | .3 | 8.4 |

*See Section 5.3.4 for a description of project alternatives.

Figure V-21

TOTAL EMISSIONS OF CARBON MONOXIDE, HYDROCARBONS NITROGEN OXIDES FROM PRIMARY LINK NETWORK (100 TONS/YEAR)

| Alternative* | 1980 CO Road | CO Track | CO Total | HC Road | HC Track | HC Total | $NO_x$ Road | $NO_x$ Track | $NO_x$ Total |
|---|---|---|---|---|---|---|---|---|---|
| No Build | 43.0 | .3 | 43.3 | 5.1 | .2 | 5.3 | 4.6 | .3 | 4.9 |
| FH-2b, FH-6 | 43.0 | .3 | 43.3 | 5.1 | .2 | 5.3 | 4.6 | .3 | 4.9 |
| FH-2, FH-5 | 43.8 | .3 | 44.1 | 5.2 | .2 | 5.4 | 4.7 | .3 | 5.0 |
| FH-4 | 43.7 | .3 | 44.0 | 5.2 | .2 | 5.4 | 4.7 | .3 | 5.0 |

*See Section 5.3.4 for a description of project alternatives.

Figure V-22

TOTAL EMISSIONS OF CARBON MONOXIDE, HYDROCARBONS, NITROGEN OXIDES FROM PRIMARY LINK NETWORK (100 TONS/YEAR)

| Alternatives* | 2000 CO Road | CO Track | CO Total | HC Road | HC Track | HC Total | $NO_x$ Road | $NO_x$ Track | $NO_x$ Total |
|---|---|---|---|---|---|---|---|---|---|
| No Build | 25.0 | .3 | 25.3 | 3.2 | .2 | 3.4 | 2.4 | .3 | 2.7 |
| FH-2b, FH-6 | 25.4 | .3 | 25.7 | 3.2 | .2 | 3.4 | 2.4 | .3 | 2.7 |
| FH-2, FH-5 | 26.4 | .3 | 26.7 | 3.4 | .2 | 3.6 | 2.5 | .3 | 2.8 |
| FH-4 | 26.3 | .3 | 26.6 | 3.4 | .2 | 3.6 | 2.5 | .3 | 2.8 |

*See Section 5.3.4 for a description of project alternatives.

### 5.3.7 Predicted Carbon Monoxide Concentrations and Relation to Standards - Microscale Analysis

Seven cross-sections were selected along the Southwest Corridor as indicators of the change in carbon monoxide concentrations which would occur from construction of the various project alternatives. The cross-sections were located in sensitive receptor areas, i.e., in areas where maximum public exposure to peak CO levels is predicted to occur. The cross-sections are identified in Figure V-23. Detailed modeling simulations were conducted along each cross section for each of the seven impact modeling cases (see Section 5.2.4). The "worst-worst" case was assumed in each instance, i.e., the joint occurrence of peak traffic and most adverse meteorological conditions. The meteorological conditions responsible for high ground-level pollutant concentrations resulting from ground-based emission sources are a shallow mixing depth, low wind speed, and stable atmospheric thermal structure. The specific meteorological conditions chosen to represent poor atmospheric dispersion and dilution of pollutants were a mixing depth of 100 meters, a mean wind speed of 2 miles per hour, and Pasquill's atmospheric stability class "D." The 100-meter mixing depth is a typical value corresponding to the top of the turbulent surface boundary layer in an urban area. A mean wind speed of two miles per hour was used as a conservative estimate of worst case conditions. Class "D" represents the most stable ground-level atmospheric stability characteristic of urban areas.

The APRAC-lAmodel was applied to predict 1-hour maximum carbon monoxide (CO) concentrations in the project area. Eight-hour maximum concentrations were calculated using an EPA methodology[1] and air quality data[2] measured elsewhere in Boston. The results of the modeling simulations along each cross-section for each of the seven alternatives are presented in a series of graphs contained in Appendix B. The maximum 1-hour CO concentration predicted along each cross-section for each alternative is presented in Figures V-24, V-25 and V-26 for the years 1975, 1980, and 2000, respectively. Maximum eight-hour concetrations corresponding to the above alternatives are presented in Figures V-27, V-28 and V-29.

The model was applied to predict concentrations using all possible wind directions of a 24-point compass. Because of the complex source-receptor interactions in a large urban environment, no single wind direction produced the worst conditions at all receptor sites. Therefore, the data presented in the cross-section graphs and in Figures V-24 through V-29 are a composite of the highest values at each receptor site.

The impact of the build alternatives on projected CO levels are summarized below for each cross-section. This discussion is limited to a relative comparison of project alternatives. An assessment of the relation of predicted concentrations to air quality standards is given later in this section. For each cross-section, predicted concentrations resulting from a given build alternative in a given year were compared levels noted for a certain alternative are relative to the no-build alternative. Build concentrations differing from the associated no-build concentrations by more than ten percent were deemed to be significant.

Cross-section 1 - No significant change in CO levels is predicted to occur in 1975 or 1980 as a result of project implementation. In 2000 construction of Alternatives FH-2, FH-4 or FH-5 would result in an overall 60 percent increase in CO levels.

Cross-section 2 - Concentrations resulting from implementation of Alternatives FH-4 or FH-5 would result in a 25-30 percent increase in 1975

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[1] Guidelines for Air Quality Planning and Analysis, Volume 9, EPA-450-4-75-001, U.S. Environmental Protection Agency, Washington, D.C.

# SOUTHWEST CORRIDOR TRANSPORTATION IMPROVEMENTS

## ENVIRONMENTAL IMPACT ANALYSIS

MASSACHUSETTS BAY TRANSPORTATION AUTHORITY
MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS

## STUDY AREA

LOCATION OF CO CONCENTRATION CROSS-SECTIONS IN THE SOUTHWEST CORRIDOR

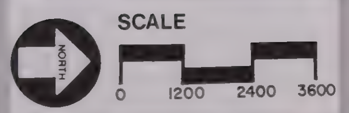


FIGURE V-23

and 1980. These alternatives would result in a 92 percent increase in CO levels in 1995.

Cross-section 3 - Implementation of Alternatives FH-2, FH-4 or FH-5 in 1975 and 1980 would result in CO concentrations 2.8 times greater than those of the no-build case. In 2000 these alternatives would result in CO levels approximately 3.4 times greater than no-build. Alternatives FH-26 and FH-6 would not significantly differ from the no-build concentrations.

Cross-section 4 - Alternatives FH-2 or FH-4 would result in CO concetrations approximately 2.5 to 3.2 times greater than the no-build levels in all three design years. Alternatives FH-2b and FH-6 are not significantly different from the no-build case.

Cross-section 5 - Alternatives FH-2, FH-2b, FH-4, FH-5 and FH-6 are 1.5 to 2.5 times greater than the no-build alternative in all design years.

Cross-section 6 - Implementation of Alternatives FH-2, FH-4 or FH-5 would result in a 12 to 25 percent increase in CO levels over the no-build case.

Cross-section 7 - Implementation of Alternatives FH-2 or FH-4 would result in CO levels increasing by a factor of 2 to 2.5 in all design years.

As noted in previous section, the combined intent of Federal new car emission standards and the Boston Transportation Control Plan (TCP) is to reduce ambient pollutant concentrations below the Federal Air Quality Standards before May 31, 1977, and to maintain these levels once achieved. The effect of these controls, plus the increase in vehicle miles traveled resulting from growth in population and commerce for the project area, is presented in Figures V-24 through V-29 in the form of predictions of air quality resulting from the no-build case. Comparison of the no-build concentrations with air quality standards indicates that indeed no exceedances of the 1-hour (35 ppm) or 8-hour (9 ppm) CO air quality standards are predicted to occur at any of the cross-sections during any of the design years. Predicted CO levels for the build alternatives also indicates no exceedance of the 1-hour standard along any cross-section in any design year. However, predicted 8-hour concentrations indicate that the 8-hour standard will be exceeded at a number of locations throughout the corridor in 1975 (see Figure V-27). By 1980, however, the effects of motor vehicle controls and the TCP result in attainment of the 8-hour standard for all build alternatives and maintenance of this standard through 2000.

The results of this analysis indicate that construction of any of the rail/arterial street build alternatives in 1980 will not interfere with the attainment or maintenance of CO air quality standards.

FIG. V-24

MAXIMUM 1-HOUR CARBON MONOXIDE CONCENTRATIONS FOR ALL PROJECT ALTERNATIVES ALONG SELECTED CROSS-SECTIONS IN THE YEAR 1975

| Cross Section+ | Alternatives* No Build | FH-2b FH-6 | FH-2 FH-5 | FH-4 |
|---|---|---|---|---|
| 1 | 14.98 | 14.98 | 14.91 | 14.88 |
| 2 | 11.91 | 11.91 | 15.53 | 15.54 |
| 3 | 6.73 | 6.73 | 18.77 | 18.77 |
| 4 | 8.41 | 8.41 | 21.46 | 21.57 |
| 5 | 17.67 | 28.08 | 30.69 | 30.69 |
| 6 | 27.75 | 28.12 | 31.16 | 31.16 |
| 7 | 13.94 | 27.68 | 30.94 | 30.94 |

*See Section 4.3.4
+See Figure V-23

FIGURE V-25

MAXIMUM 1-HOUR CARBON MONOXIDE CONCENTRATIONS FOR ALL PROJECT ALTERNATIVES ALONG SELECTIVE CROSS SECTIONS IN THE YEAR 1980

| Cross Section+ | Alternatives* No Build | FH-2b FH-6 | FH-2 FH-5 | FH-4 |
|---|---|---|---|---|
| 1 | 6.91 | 6.91 | 6.86 | 6.84 |
| 2 | 5.48 | 5.48 | 7.15 | 7.15 |
| 3 | 3.09 | 3.09 | 8.63 | 8.63 |
| 4 | 3.96 | 3.96 | 9.87 | 10.01 |
| 5 | 8.13 | 12.92 | 14.11 | 14.11 |
| 6 | 12.76 | 12.94 | 14.33 | 14.33 |
| 7 | 6.27 | 12.73 | 14.23 | 14.23 |
| 8 | 2.07 | 4.46 | 4.46 | 4.46 |
| 9 | 1.35 | 3.26 | 3.26 | 3.26 |
| 10 | 5.70 | 5.76 | 5.76 | 5.76 |

*See Section 5.3.4
+See Figure V-23

FIGURE V-26

MAXIMUM 1-HOUR CARBON MONOXIDE CONCENTRATIONS FOR ALL PROJECT ALTERNATIVES ALONG SELECTED CROSS-SECTIONS IN THE YEAR 2000

| Cross Section+ | Alternatives* No Build | FH-2b FH-6 | FH-2 FH-5 | FH-4 |
|---|---|---|---|---|
| 1 | 4.02 | 4.02 | 6.41 | 6.40 |
| 2 | 3.18 | 3.18 | 6.09 | 6.09 |
| 3 | 1.80 | 1.80 | 6.18 | 6.18 |
| 4 | 1.90 | 1.90 | 6.12 | 6.20 |
| 5 | 4.72 | 9.16 | 9.09 | 9.09 |
| 6 | 7.41 | 7.41 | 9.21 | 9.21 |
| 7 | 4.00 | 9.07 | 9.16 | 9.16 |

*See Section 5.3.4
+See Figure V-23

Figure V-27

MAXIMUM 8-HOUR CARBON MONOXIDE CONCENTRATIONS FOR ALL PROJECT ALTERNATIVES ALONG SELECTED CROSS-SECTION IN THE YEAR 1975

| Cross Section+ | Alternatives* No Build | FH-2b FH-6 | FH-2 FH-5 | FH-4 |
|---|---|---|---|---|
| 1 | 8.99 | 8.99 | 8.95 | 8.93 |
| 2 | 7.15 | 7.15 | 9.32 | 9.32 |
| 3 | 4.04 | 4.04 | 11.26 | 11.26 |
| 4 | 5.05 | 5.05 | 12.88 | 12.94 |
| 5 | 10.60 | 16.85 | 18.41 | 18.41 |
| 6 | 16.65 | 16.87 | 18.70 | 18.70 |
| 7 | 8.36 | 16.61 | 18.56 | 18.56 |

*See Section 5.3.4
+See Figure V-23

FIGURE V-28

MAXIMUM 8-HOUR CARBON MONOXIDE CONCENTRATIONS FOR ALL PROJECT ALTERNATIVES ALONG SELECTED CROSS-SECTIONS IN THE YEAR 1980

| Cross Section+ | Alternatives* No Build | FH-2b FH-6 | FH-2 FH-5 | FH-4 |
|---|---|---|---|---|
| 1 | 4.15 | 4.15 | 4.12 | 4.10 |
| 2 | 3.29 | 3.29 | 4.29 | 4.29 |
| 3 | 1.85 | 1.85 | 5.18 | 5.18 |
| 4 | 2.38 | 2.38 | 5.92 | 6.01 |
| 5 | 4.88 | 7.75 | 8.47 | 8.47 |
| 6 | 7.66 | 7.76 | 8.60 | 8.60 |
| 7 | 3.76 | 7.64 | 8.54 | 8.54 |

*See Section 5.3.4
+See Figure V-23

FIGURE V-29

MAXIMUM 8-HOUR CARBON MONOXIDE CONCENTRATIONS FOR ALL PROJECT ALTERNATIVES ALONG SELECTED CROSS-SECTIONS IN THE YEAR 2000

| Cross Section+ | Alternatives* No Build | FH-2b FH-6 | FH-2 FH-5 | FH-4 |
|---|---|---|---|---|
| 1 | 2.41 | 2.41 | 3.85 | 3.84 |
| 2 | 1.91 | 1.91 | 3.65 | 3.65 |
| 3 | 1.08 | 1.08 | 1.18 | 3.71 |
| 4 | 1.14 | 1.14 | 3.67 | 3.72 |
| 5 | 2.83 | 5.50 | 5.45 | 5.45 |
| 6 | 4.45 | 4.45 | 5.53 | 5.53 |
| 7 | 2.40 | 5.44 | 5.50 | 5.50 |

*See Section 5.3.4
+See Figure V-23

### 5.3.8 Parking Facility Impacts

One new parking facility is proposed for the Southwest Corridor. A 500 capacity structure is planned for the MBTA station at Forest Hills. Currently about 900 vehicles are parked (a large number illegally so) in the immediate vicinity of the Forest Hills Station. The illegal parking of motor vehicles along roadways in this area is a problem which adds to traffic congestion. In the past, petitions signed by neighborhood residents supporting the creation of an off-street lot for commuters have been received by the City of Boston. Coupled with the completion of the new off-street parking facility certain existing facilities will be eliminated and can be returned to park use. In addition a program of increased enforcement of parking regulations should be implemented at Forest Hills. Thus, the construction of the new parking facility will not significantly increase existing parking spaces at Forest Hills.

### 5.3.9 Stationary Source Impacts

Increased service on the MBTA Orange Line, as a result of its relocation in the Southwest Corridor, will require additional electrical power. This additional power will be produced either by one of the existing MBTA power generation station located in Boston, or it will be purchased from the Boston Edison Company. To generate this additional power, more fuel must be burned resulting in increased power plant emissions.

To evaluate the relative impact of this change, an estimate of the increase in Orange Line service was obtained from the MBTA; the predicted daily increase in 684 car-miles. The associated increase in electrical demand is equivalent to the consumption of the additional 87,235 gallons of residual oil at an electrical generating station.[1]

Figure V-30 compares this increase with the average daily fuel use of the MBTA in recent years and the total residual oil burned in the Metropolitan Boston area. The results of this analysis indicate that the change in fuel use will be insignificant compared to the total fuel used in the area. In addition, the pollutants resulting from increased fuel use (sulfur dioxide, $SO_2$ , and the total suspended particulate, TSP) will be emitted to the atmosphere through a relatively tall stack (75-150 meters). This will allow sufficient diffusion of the material so that no measurable increase in $SO_2$ and TSP concentrations will occur at ground level.

This analysis does not take into account any diverstion from automobile use to the transit facility and is therefore conservative in this respect.

FIGURE V-30

RESIDUAL OIL FUEL USE BY STATIONARY SOURCES

| Stationary Source Category | Fuel Use ($10^3$ gal) | Percent Orange Line Increment |
|---|---|---|
| Orange Line Increment (1980) | 87.2 | 100% |
| Total MBTA Generating Stations (1972) | 23,944 | 0.36% |
| Total Metropolitan Boston (1972) | 2,142,328 | 0.004% |

### 5.3.10 Estimation of Emission Loadings from Land Development in the Southwest Corridor

The purpose of this section is to estimate the stationary source emissions resulting from the development of vacant parcels of land adjacent to the planned transportation facilities. The general approach used was to estimate the emissions from the planned building floor area or number of apartments in each parcel, using a land use based emission factor (tons of emissions per year per square foot floor area). The land use based emission factor is a product of the fuel consumption per square foot of floor area and the emissions per unit fuel consumption.

[1] "Characteristics of Urban Transportation Systems" Department of Transportation, UMTA, May 1975.

The development of a set of reliable land use based emission factors is currently the subject of a research study we are conducting for EPA. Therefore, the factors used in this study are provisional, although they do reflect the state-of-the-art. The sources used for the emission factors are:

For residential, retail, and office uses[1]
For light industrial uses[2]
For schools and colleges[3]

In general, it was assumed that reidusal oil would be the primary fuel for space heating purposes.

Using the planned development on each parcel, low and high estimates for each neighborhood were prepared. These are shown in Figure V-31. Parcels which have alternate uses are shown separately. Using the emission factors, estimated low and high emissions for each neighborhood were prepared. These are shown in Figure V-32 along with the totals for the entire corridor.

To provide a perspective of the impact of the new development in comparison with existing emissions in the area, also presents emissions estimates from the 30 inner cities and towns of Metropolitan Boston. Comparison of the proposed loadings with the regional total indicates that the proposed increase is less than 0.2 percent of the existing emissions for sulfur oxides, particulate matter, and nitrogen oxides and negligible for hydrocarbons and carbon monoxide.

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[1] Environmental Impact, Efficiency, and the Cost of Energy, Supply and End Use, Volume 1, Hitlman Associates, Inc., November,1974.

[2] Hackensack Meadowlands Air Pollution Study - Emission Projection Methodology Environmental Research and Technology, October, 1973.

[3] Development of A Methodology to Allocate Fossil Fuel Consumption by County, Walden Research, March, 1974.

FIGURE V-31

SUMMARY OF PLANNED DEVELOPMENT BY NEIGHBORHOOD

| Section | | Other | Light Man'f (Sq. Ft) | Retail (Sq. Ft) | Office (Sq. Ft) | Housing Units |
|---|---|---|---|---|---|---|
| Roxbury Section | Low: | 4000 std Com. Col. | 398750 | 110000 | 109000 | 510 |
| | High: | 4000 std Com. Col. | 398750 | 234000 | 354000 | 1450 |
| Jamaica Plain: Build Option | | SWII High School | | 33000 | 0 | 65 |
| | C1 | | | 12000 | OR | 100 |
| | C2 | | 40000 | | OR | 25 |
| | C4XW | | | 20000 | OR | 15 |
| Jamaica Plain: No-Build Option | | SWII High School | | 71000 | 0 | 65 |
| | B1 | | | 20000 | OR | 150 |
| | B2 | | 20000 | | OR | 15 |
| | B4XW | | | 20000 | OR | 15 |
| South End-Mass. Ave. Station | | | | | | |
| | Low: | | | 3000 | | |
| | High: | | | 40000 | 160000 | |
| Back Bay Station | | | | | | |
| | Low: | | | 3000 | | |
| | High: | | | | 400000 | |

FIGURE V-32

STATIONARY SOURCE EMISSION LOADINGS FROM DEVELOPMENT

| Neighborhood | | Tons of Pollutant Emissions per Year | | | | |
|---|---|---|---|---|---|---|
| | | PM | $No_x$ | $SO_2$ | HC | CO |
| Jamaica Plain Build Option | | | | | | |
| | Low: | 2.59 | 7.00 | 14.44 | 0.46 | 0.47 |
| | High: | 4.12 | 8.72 | 20.54 | 0.73 | 0.97 |
| Jamica Plain No-Build Option | | | | | | |
| | Low: | 3.45 | 9.34 | 23.73 | 0.57 | 0.48 |
| | High: | 4.67 | 10.77 | 30.53 | 0.86 | 1.14 |
| Roxbury | | | | | | |
| | Low: | 19.13 | 29.47 | 73.70 | 3.07 | 2.39 |
| | High: | 32.11 | 57.08 | 172.62 | 5.87 | 6,09 |
| South End, Mass. Ave. Station | | | | | | |
| | Low: | 0.06 | 0.19 | 0.68 | 0.01 | 0.00 |
| | High: | 3.97 | 10.57 | 45.60 | 0.54 | 0.09 |
| Back Bay Station | | | | | | |
| | Low: | 0.06 | 0.16 | 0.68 | 0.01 | 0.00 |
| | High: | 7.95 | 21.14 | 91.20 | 1.08 | 0.18 |
| Total, with Jamaica Plain Build Option | | | | | | |
| | Low: | 21.84 | 36.82 | 89.50 | 3.55 | 2.86 |
| | High: | 48.15 | 97.51 | 329.96 | 8.22 | 7.33 |
| Total, with Jamaica Plain No-Build Option | | | | | | |
| | Low: | 22.70 | 39.16 | 98.79 | 3.66 | 2.87 |
| | High: | 48.70 | 99.56 | 339.95 | 8.35 | 7.50 |
| Total, 30 Inner Cities an Towns in Metropolitan Boston (1970) | | 28919 | 156481 | 252778 | 168650 | 707599 |

5.3.11 Conclusions. The study described in Section 5.2 yielded the following general conclusions.

- A macroscale comparison of total vehicle miles traveled and total emissions of three motor vehicle-related pollutants (CO, HC, and $NO_x$) for three build alternatives relative to the no-build indicate that all build cases except Alternatives FH-2b and FH-6 would result in an increase in total project corridor emissions. Total emissions for Alternatives FH-2b and FH-6 are not significantly different from those for the no-build case. Thus, of all the build alternatives evaluated, only Alternatives FH-2b and FH-6 are consistent with the State Implementation Plan to attain and maintain air quality standards for photochemical oxidants. It should be noted, however, that this conclusion is a direct result of the specification of an average vehicle speed of 20 mph in the project corridor for existing and future build alternative conditions. In other words, the projected traffic data on which this analysis was based does not show an increase in average vehicle speed in the Southwest Corridor (i.e., a decrease in congestion) due to the construction of an arterial street.

- A microscale analysis of worst case carbon monoxide concentration along the corridor indicate that construction of the arterial will increase CO levels relative to no-build projections. Comparison of predicted CO levels with air quality standards indicate that no exceedances of the 1-hour standard of 35 ppm will occur along the corridor in 1975, 1980, or 2000. No exceedances of the 8-hour standard of 9 ppm are predicted for the no-build case in any design year, and for all build alternatives in 1980 (the estimated year of completion) and 2000. The only predicted exceedances of the 8-hour standard are for an evaluation of the build alternatives in the year 1975. Thus, none of the Build alternatives will interfere with attainment or maintenance of air quality standards for CO.

- Increased power requirements for the relocated Orange Line will be satisfied without significantly increasing the consumption of residual oil by stationary sources in the Metropolitan Boston area.

- Development of land along the Southwest Corridor will not result in significant increases in total residual oil fuel use in Metropolitan Boston. Total emissions of all pollutants will increase less than 0.2 percent if full development occurs.

## 5.4 Water Resources Impacts

### 5.4.1 Flooding

In the "modified-embankment" alternative, the existing embankment will be widened to accommodate the proposed rail/transit improvements. The existing pattern of the drainage systems and the quantity of runoffs resulting from storms in this alternative is not expected to change appreciably in comparison to the existing conditions.

Construction of an arterial street in conjunction with this alternative normally would increase the runoff quantities. Because of the elimination of certain paved areas in the new roadway design, however, the change in the runoff quantities (in comparison to the flood discharge capacity of the Stony Brook Conduit) will be negligible. Its influence on the hydraulic characteristics of the conduit will be minimal.

In the depressed or modified depressed alternatives, the proposed rail/transit improvements will be placed at a lower elevation than the adjacent areas. Consequently the existing drainage systems will be kept unchanged. This will be accomplished by replacing drainage pipes (where they are intercepted by the depressed rail/transit alignment) with the siphon crossings as decribed in subsection 5.2.5.2.

The storm runoff in the depressed area will be collected by a separate system and will be pumped into a suitable outfall structure as found most economical in the final design - probably into the Stony Brook Conduit where it crosses the right-of-way. The quantities of storm runoff discharged into the Conduit in the depressed alternative is not expected to have any appreciable effect upon flow in the Conduit.

### 5.4.2 Water Quality

Sediments. Deposition of sediment into the nearby drainage facilities and bodies of water is of great concern to the community in any major construction project. The heavist concentration of sediment in a construction project generally occures where the newly exposed excavation areas are permitted to erode during heavy rainfalls and runoff.

The use of proper erosion and runoff-controlling measures during construction will prevent large amounts of sediment from being deposited into the existing drainage facilities including the Stony Brook Conduit. Without these measures, part of the sediment would be transported to the Stony Brook Conduit outfalls where it would be deposited into the Back Bay Fens Pond and Charles River Basin. The remaining sediment would settle in the drainage facilities, thus reducing their hydraulic capacities and possibly clogging some of the smaller pipes.

Measures to control erosion and siltation as runoff include the installation of setting tanks and the quick covering of regraded areas.

Station Wastes. The sanitary sewage of the stations will be discharged to the nearest existing sewer system. No impact is, therefore, anticipated from sanitary waste from the Stations.

## 5.5 Prediction and Assessment of Future Noise and Vibration Conditions

### 5.5.1 Noise Scales and Criteria

The purpose of the noise and vibration impact analysis is to describe the future noise environment that will result if the proposed project is implemented, and to assess this environment both in comparison to the present noise environment and in comparison to standards and criteria. The Southwest Corridor Project involves not only the relocation of the MBTA Orange Line from Washington Street to the present Penn Central alignment, but also the reconstruction of the railroad right of way and the construction of a new arterial street. Eliminating the Washington Street elevated will of course be a great improvement in the noise environment for those who live on or close to Washington Street. On the other hand, implementation of the project could degrade the environment of those who live near the Penn Central alignment. It is the goal of this analysis to quantify the noise impact that is expected to result. The effectiveness of various noise abatement techniques that may be used to minimize this impact is discussed in Section 6.5.

A discussion of noise level scales was presented earlier in Section 2.3.2 on existing conditions. Therefore, only a brief review will be presented here. In general, only two noise level scales are used in this discussion: the peak noise level for a single event, and the energy average noise level for a given period of time. The peak noise level is the maximum reading that one would obtain on a sound level meter, for example, during the passage of a train or truck. It depends on the distance between the vehicle and the observer and the speed of the vehicle. The energy average sound level, $L_{eq}$, is the equivalent steady sound level that contains as much sound energy as a fluctuating noise during a given period of time. The average sound level also depends on the distance from the vehicle to the observer and the speed of the vehicles, and, in addition, it depends on the number of vehicles that pass during the specified period of time. In this discussion the peak noise level scale is used to describe the noisiness of a single event, and the energy average noise level scale is used to describe the region of impact associated with passage of a large number of trains, trucks or automobiles.

The choice of the sound level scales discussed above is due in part to the choice of criteria by which noise impact will be assessed. Because the proposed project involves not only the rapid transit relocation and railroad improvements and higher frequencies and also the construction of an arterial road, both the Urban Mass Transit Administration and the Federal Highway Administration are involved. UMTA has no specific noise standards or criteria for projects which it funds; FHWA, on the other hand, does have specific design noise levels based on land use categories that must be addressed. Since UMTA has no noise standards, and since the proposed project involves the construction of an arterial road that must be addressed in terms of the FHWA design noise levels, it was decided to also address the impact of the rapid transit portion of the project in terms of the FHWA design levels. Specifically, impact will be noted in residential areas if the estimated average noise level for the loudest hour of the day exceeds 67 dB. If the rapid transit system noise does not exceed $L_{eq}$ 67 dB, then the noise environment is also in compliance with:

1. the standards of the U.S. Department of Housing and Urban Development,
2. criteria for adequate speech communication inside neighboring buildings, and
3. the guidelines of the Institute for Rapid Transit.

An assessment of the project as a whole is also performed in terms of the "Fractional Impact Method", which is presently under development by the U.S. Environmental Protection Agency. In this method a variation of the $L_{eq}$ sound level known as the day-night average sound level, $L_{dn}$, is used to assess impact. Below $L_{dn}$ 55 dB, there is no impact and for each 5 dB increase, the fraction of impact goes up by 25 percent. For example, if 1000 people were exposed to $L_{dn}$ 65 dB the "equivalent number of people impacted" (ENI) would be 500.

A more detailed discussion of noise impact criteria is provided in the Appendix, where groundborne noise and vibration criteria are also discussed.

### 5.5.2 Rail Noise Prediction and Assessment

#### 5.5.2.1 Prediction Techniques

This section presents the ingredients and results of the rail noise predictions, and an assessment of these predictions in terms of both present conditons and absoluted criteria. The mathematical method used to obtain the predictions is explained in the technical Appendix H on noise, The noise predictions are for peak hour operations in the design year 2000.

For rail noise predictions, the important parameters are the relative numbers of each car or locomotive type and their corresponding speeds. Sound level information as a function of speed is discussed in the technical appendix. The volume and speed information is presented in Figures V-33, V-34, and V-34A which show the number of vehicles at various times throughout the day and the maximum speed as a function of location between Route 128 and South Station.

During peak hour the MBTA Orange Line is expected to operate at headways of four minutes, that is 30 trains per hour counting both directions. The trains will be six cars in length and the expected maximum speed between stations is 45 mph.

For the predictions it was assumed that all trains will run on welded rail on ties and ballast. In the South End the baseline condition calls for lowering the present alignment by approximately two to five feet in order to get the catenary wires under the bridges.

Noise predictions were made assuming that no special noise control features was implemented. Noise control devices or techniques such as walls at the edge of the right-of-way will be discussed later.

South of Massachusetts Avenue three baseline cases were assumed: the depressed, the embankment, and the modified depressed alternatives. The detail descriptions of the various alternatives studied are presented in Section 4.4. The predictions for the embankment and modified depressed alternatives were based on the assumption that noise barriers were not present. As in the case of the South End, special noise control features will be discussed after the predictions for the baseline conditions are presented.

One alternative that must always be considered in an environmental analysis is simply to do nothing - this is referred to as the "No Build" alternative. Since this alternative exists now, actual noise measurements instead of predictions were used to characterize it. A description was presented earlier in Section 2.3.2 and the predicted noise levels for the build alternatives are compared below. Even without going into detail, it is clear that there is more overall noise impact for the No Build alternative than there is for any of the build alternatives. The passage of a train on the Washington Street steel elevated structure is 20 to 30 decibels louder than is expected if the Orange Line runs at grade on welded rail supported on ties with ballast though the location of the noise is different. When trains run on the steel elevated, the structure itself radiates noise. Although many residences in the South End are very close to the tracks where the Orange Line would be relocated, the present Washington Street alignment is much louder and closer to residences along a greater portion of its length. It clearly impacts more people than the proposed build alignments. This, of course, does not imply that a detailed assessment is not necessary for the build alternatives, but simply that the no build alternative is not the minimum noise impact alternative that it might be for many other projects.

The material which follows indicates those places where impact is expected to occur for the build alternatives. What steps can be taken to minimize this impact are detailed in Section 6.5.

The results of the noise predictions are shown in the form of contours of equal average noise level. Based on the noise impact criteria, the impact occurs when the noise level exceeds $L_{eq}$67 dB. In terms of the noise contours there will be noise impact within the curve labeled $L_{eq}$ 67 dB unless steps are taken to attenuate the noise.

As points of reference, the noise contours five decibels above and below the criterion, $L_{eq}$ 72dB and $L_{eq}$ 62 dB, are also shown. If the noise level from all trains were to decrease by five decibels the noise level at the $L_{eq}$ 67 dB contours would decrease by five decibels to $L_{eq}$ 62 dB. Thus, the $L_{eq}$ 62 dB contour shows the impact zone for a five decibel decrease in the noise level. In a similar manner, the $L_{eq}$ 72 dB contour shows the impact zone if the noise levels were to increase by five decibels.

In some cases, one or more of the noise contours stop at a row of houses or a large building. This is because the house or buildings shield the area behind them from the noise. The interpretation in these cases is that the sound level at the facade of the houses or buildings is at least equal to the noise level of the highest level contour that stops there, and that the noise level behind the houses or buildings is less than the lowest level contour that stops at the facade.

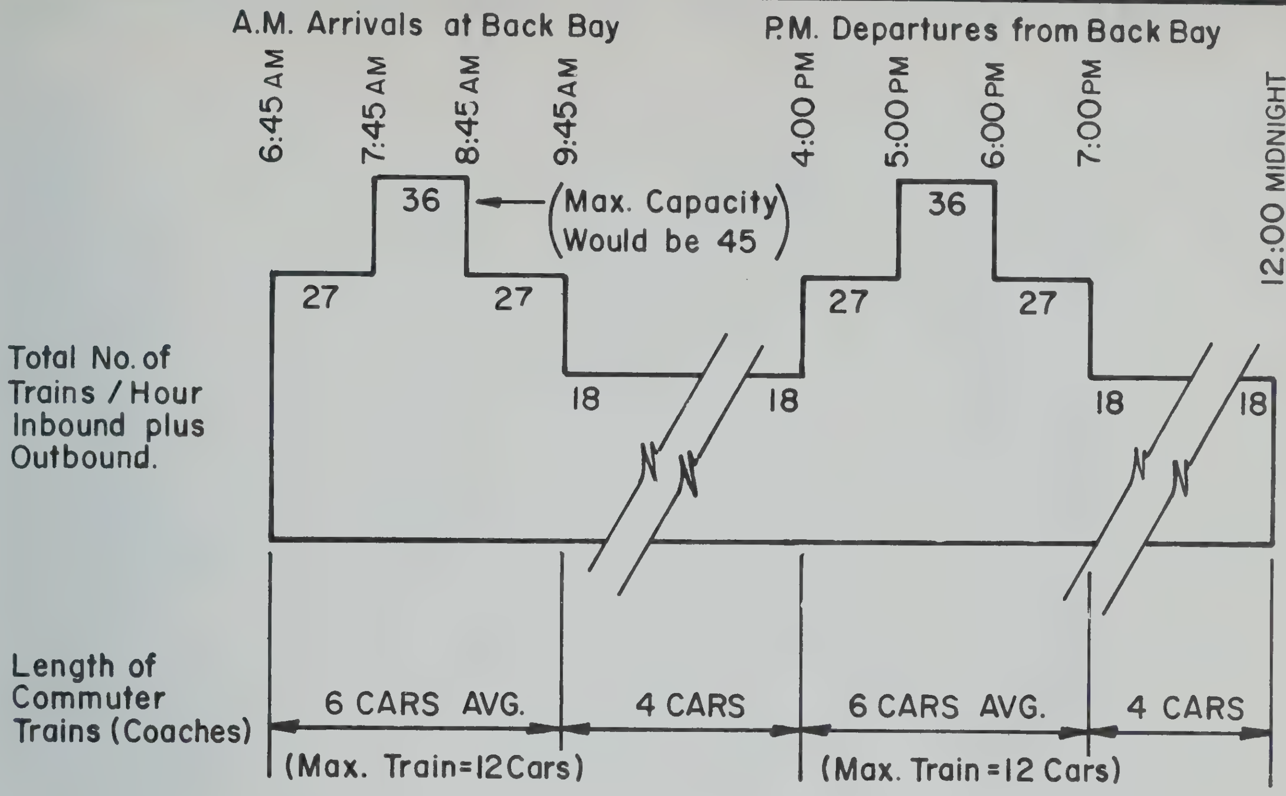
In the figures where both the proposed new arterial street and the rail alignment are shown, the noise contours show the combined effect of both of these facilities. The region of impact for the rail facility alone can be seen simply by finding the figures for alternatives that do not include the proposed arterial street.

#### 5.5.2.2 Impact Assessment

Starting at the northern end of the proposed project, the first residential area near the tracks is the neighborhood to the south of the present Penn Central tracks between Arlington Street and Clarendon Street. Most of the houses that could be affected here are on St. Charles Street or Cazenove Street. This is the section of the rail right-of-way between Back Bay Station and Shawmut Avenue. The Penn Central tracks are paralleled by the Boston and Albany tracks and the Massachusetts Turnpike.

The initial estimates of noise in this neighborhood as shown by the noise contours are for the case where the tracks are not covered. Because the station platforms for Back Bay will extend all the way to Berkeley Street,a deck over the tracks is proposed as a barrier between the tracks and the turnpike to shield both residents and waiting passengers from turnpike traffic noises. A discussion of noise reduction benefits of this deck is provided in Section 6.5 after the discussion of the estimated noise levels without the deck.

The estimated peak hour average noise level at the closest residence due to future rail operations is $L_{eq}$ 77 dB if the Orange Line is at surface, and unshielded. This is a full ten decibels above the impact criterion. However, the existing peak hour average noise is $L_{eq}$ 80 dB due primarily to noise from the Turnpike. If the noise from the Turnpike remains relatively constant in the future, the combined traffic and rail average noise levels at the closest residence will be approximately $L_{eq}$ 82 dB. This is clearly an extremely high environmental noise level for a residential neighborhood.




Notes: 1) AMTRAK Trains are included in the number of trains shown above.

Assume 6 (total for both directions) at 12 cars in peak hour (AM & PM)
Assume 2 (total for both directions) at 8 cars per hour in off-peak periods
Assume 6 (total for both directions) at 6 cars between midnight and 6:45 AM.

2) In the peak periods assume 2 trains in the peak direction for every 1 in the reverse direction. Thus in the AM peak hour each RR track would carry 12 trains giving a total of 24 inbound and 12 outbound, for a 3 track configuration.

3) Assuming the AMTRAK Route is electrified, all their trains plus the Boston-Providence and 128 Local Commuter trains would be electric locomotive hauled. This would result in 1/2 of the trains being electric during each time period. Of the remaining commuter trains 1/2 would be diesel locomotive hauled and 1/2 self-propelled diesel cars.

# SOUTHWEST CORRIDOR - SHORE LINE COMMUTER AND AMTRAK SCHEDULE

## HIGH LEVEL OF SERVICE

## YEAR 2000

FIGURE V-33

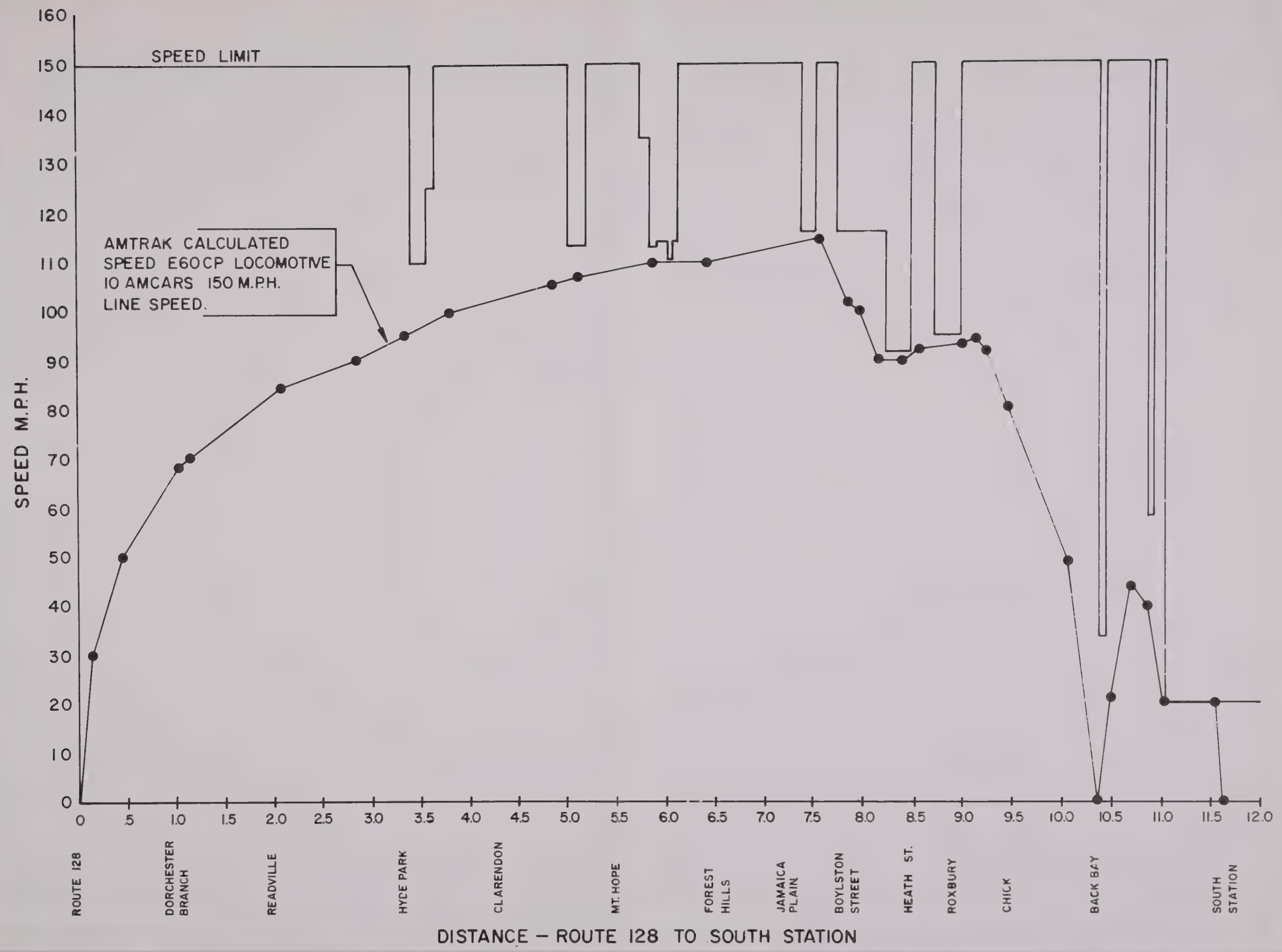
# SOUTHWEST CORRIDOR TRANSPORTATION IMPROVEMENTS

## ENVIRONMENTAL IMPACT ANALYSIS

MASSACHUSETTS BAY TRANSPORTATION AUTHORITY
MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS

## CALCULATED AMTRAK SPEED

V-34



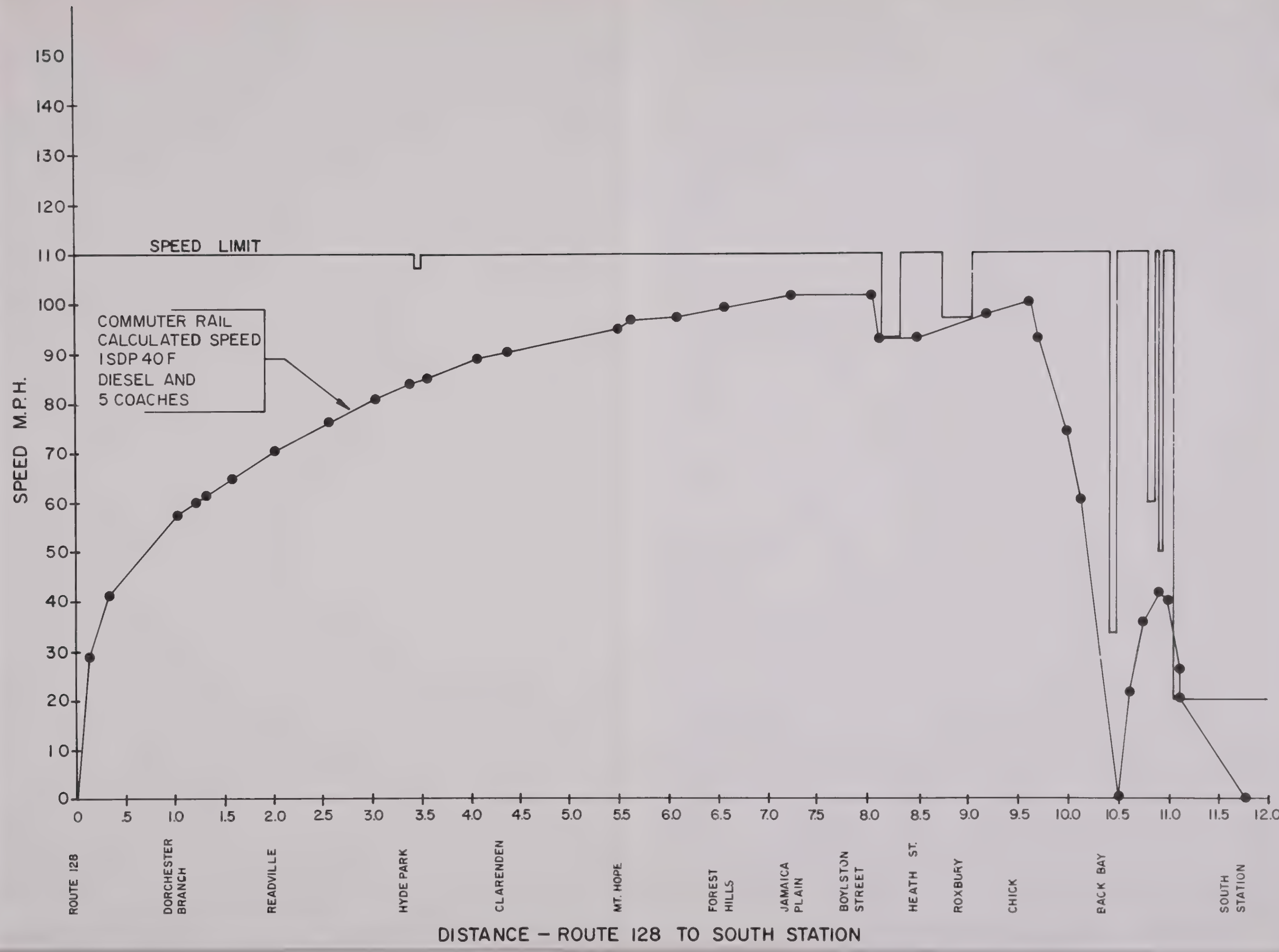
SOUTHWEST CORRIDOR TRANSPORTATION IMPROVEMENTS

ENVIRONMENTAL IMPACT ANALYSIS

MASSACHUSETTS BAY TRANSPORTATION AUTHORITY
MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS

# CALCULATED COMMUTER RAIL SPEED

V-34A




CALCULATED COMMUTER RAIL SPEED

Of all locations along the Southwest Corridor, the potential for noise and vibration impact is probably the greatest in the South End and St. Botolph neighborhoods between Back Bay Station and Massachusetts Avenue. This area is characterized by row houses which on the north side of the present Penn Central alignment directly abut the right-of-way. This is the side of the right-of-way that is proposed for the relocation of the MBTA Orange Line and increased railroad train frequencies. Southbound MBTA trains would pass within a few feet of the windows of some of these houses and apartments. The problem is further complicated by the fact that most of the adjacent buildings have windows that look down on the tracks from above; consequently, low barrier walls would be useless in keeping the noise from reaching these windows. To build even very narrow walls at the edge of this right-of-way would require at least a minimal taking of property.

The predicted future noise level at the facades of the closest buildings will be approximately $L_{eq}$ 82 dB, which is 15 decibels over the criterion for impact. This is equal to the present peak hour average noise level. The reason the future average noise level will be approximately equal to existing conditions despite a large increase in train volumes is due to the combination of using good welded rail and electrification. Also, by the year 2000, all remaining diesel locomotives will be in compliance with the new EPA noise regulations for locomotives.

As an example of how the average sound level works, a three decibel increase in the maximum noise level of all vehicles is balanced by a doubling in the number of trains, and a ten decibel decrease in the maximum noise levels of all vehicles is balanced by a ten-fold increase in the number of trains. Even though the average noise level is not expected to increase, it is recognized that the predicted future sound levels exceed the criterion by approximately 15 decibels and that steps should be implemented to minimize this impact.

If no measures are taken to abate noise, the region of impact in the South End and St. Botolph areas, that is the distance of the $L_{eq}$ 67 dB contour, would be 200 feet on both sides of the tracks. Approximately the first ten houses on each side of each street on both sides of the rail right-of-way would be impacted. The number of these houses is approximately 120.

One solution proposed as a means of eliminating the noise impact in the South End is to lower the rail grade approximately four to five feet below the present grades, construct walls at the edges of the right-of-way and cover the rail area with a lightweight deck.

One problem with this solution is that such a decking structure would block the windows providing light and air to a number of rooms along the right-of-way. This could require the acquisition of the apartments involved, blocking off the windows, and converting the rooms and/or apartments to other non-residential uses as a method of overcoming the problem. Another possible solution to blocking off the sunlight would be to put gaps in the wall and deck adjacent to the windows. The noise level at such gaps would be at least as high as without the walls and deck. To combat this, windows near the gaps would need to be soundproofed and extra sound-absorbing material would be needed inside the tunnel. This would lower outdoor noise levels overall and would protect individual rooms. As housing was rehabilitated, windows could be blocked and the deck made continuous.

Soundproofing in general would consist of installing commercially available double glazed windows. (This was done, for example, at the University of Massachusetts, Columbia Point, which is directly under a flight path of Logan Airport.)

The walls and deck solution would solve the airborne noise problem in the South End and St. Botolph areas. Inside this tunnel the sound level would be about 10 decibels higher than it is for train operation above ground in the open. This is due to the reverberant build up of the sound inside a confined space with hard walls. If the walls and deck have a sound transmission loss of 40 decibels, the sound level of a passing train would be less than that of a low speed automobile. A transmission loss of 40 decibels can be achieved with walls and deck made of four inch thick dense concrete. This would satisfy the $L_{eq}$67dB criterion by more than 15 decibels, if the deck were complete and would provide an overall level below the criterion if it were not.

Ventilation shafts may be necessary at a few locations between Back Bay Station and Massachusetts Avenue. These shafts should be acoustically treated or the sound radiated from them will be as loud as a passing train without the deck. Acoustically treated ventilation shafts are commonplace in newer transit systems such as BART and Washington METRO and, therefore, they do not present a design problem.

5.5.2.3 Vibration and Groundborne Noise

Potential vibration and groundborne noise impact along the proposed corridor is primarily a problem in the South End and St. Botolph neighborhoods. Some of the residential structures here will be within ten feet of the closest Orange Line tracks. Future vibration levels at these locations were estimated from examples found near the MBTA Red Line extension to Quincy. In the frequency range below 30 Hz (cycles per second) the Red Line vibration levels were approximately equal to the threshold of perception. This is probably better than existing conditions in the St. Botolph and South End areas; the main difference being that welded rail is used on the Red Line extension and bolted rail is used for the present Penn Central alignment. (The reader is referred to the "Appendix H" on Noise for a further discussion on the vibration impact criteria.) In this frequency range, below 30 Hz, the only vibration abatement techniques that work well are keeping the wheels trued, the rail ground and using compliant resilient rail fasteners. If these techniques are used, vibration levels can be kept below the threshold of vibration perception. Techniques such as "floating-slab" track beds only work at the higher frequencies discussed below.

The stiffness of the fasteners under load must be 75,000 to 100,000 lb. per inch or less to work effectively. The Toronto Transit System has used such fasteners for several years with good success. Rail discontinuities, such as cross-overs and insulated signaling joints should not be placed within 100 feet of noise and vibration sensitive sites including residences.

Ground vibration in the frequency range above 30 Hz can vibrate the walls and floors of nearby buildings and cause them to radiate an audible rumbling noise. Again, wheel truing, rail grinding and the use of resilient rail fasteners are the first steps to solving this problem. Ballast is also useful in reducing groundborne noise. However, even wheel truing, rail grinding, resilient rail fasteners and ballast probably will not solve the groundborne noise problem at the closest windows. If a concrete slab track bed is used in the St. Botolph and South End areas, then good vibration isolation should be provided between the rails and the slab. The types of solutions that should be considered are: (1) "floating slab" track beds; (2) resiliently isolated double ties; (3) STEDF type ties, or (4) isolation mats such as neoprene, covered with ballast. If an acoustic deck is not built, then a solution that keeps the ballast for sound absorption is preferable.

A more thorough study of the groundborne noise problem should be conducted in the preliminary engineering design stage of this project. This study should include simultaneous vibration measurements near the

tracks and inside the closest windows. This information can then be used with vibration level measurement from trains on welded rail to more accurately predict interior noise and vibration levels in order to design adequate measures to control noise and vibration levels. (See Section 6.5). These measurements should be accompanied by strain measurements at key areas to monitor building movement, if any, as the result of construction and operations.

The solution to the groundborne noise problem depends to some degree on the solution to the airborne noise problem. It does not make sense to spend a lot of money trying to attenuate noise from one path without attenuating noise from the other path. Whatever the degree of noise attenuation that is desired, the money is best spent if the remaining noise from the two paths is approximately equal.

### 5.5.3 Arterial Street Noise Impact

#### 5.5.3.1 Prediction Technique

This section describes the noise associated with the arterial road portion of the proposed project. The Federal Highway Administration, in response to the Federal Highway Act of 1970, has specified the noise impact assessment procedure for projects which they fund. This procedure was first specified in Policy and Procedure Memorandum 90-2, and it has been recently updated in Volume 7, Chapter 3, Section 3 of the Federal-Aid Highway Program Manual (FHPM).

Some aspects of the new 773 version not contained in PPM 90-2 have been used in this analysis. The 773 version permits the use of either the $L_{10}$ sound level scale or the $L_{eq}$ sound level scale. The $L_{10}$ sound level is that sound level that is exceeded ten percent of a specified period of time; it was the only scale authorized in PPM 90-2. In this analysis the $L_{eq}$ sound level, the equivalent steady sound level, was used to specify the area of impact. This scale was used so the combined effect of roadway and railway noise could be predicted. It would not have made sense for the $L_{10}$ sound level scale to be used, because $L_{10}$ is a poor measure of events, such as railway noise, that occur less than ten percent of a given time period.

Only two noise prediction techniques are permitted by FHPM 773: the method contained in National Cooperative Highway Research Program Report 117 and the computer method described in Department of Transportation Report DOT-TSC-FHWA-72-1. Of these two methods, only the computer method can be used to determine the $L_{eq}$ sound level. It was therefore used for this project.

Based on experience gained on similar projects, it was noted that the authorized prediction methods tend to overpredict truck noise on urban roads. This is because these prediction models were primarily designed for free flowing high speed highways and not low speed urban roads. It was, therefore, decided to modify the computer model for low speed trucks; the FHWA said they would approve this modification, if supporting data were provided. Therefore, during the course of this analysis, the noise emission level of more than 100 trucks on Boston streets were measured. The results of these measurements are presented in the Technical Appendix H on noise. Based on data that was obtained and the approval of FHWA, a reduced noise emission level for trucks was used for the arterial road noise predictions.

FHPM 773 states the volume of automobiles used in the predictions should be the lesser of the design hourly volume or the maximum volume under "level of service C" conditions. This choice corresponds to the worst noise conditions for automobiles. For the proposed arterial

streets, the design hourly volume exceeded level of service C, therefore, levels of service C volumes for automobiles were used in the predictions. The design hourly truck volume was used for truck noise predictions as required by FHPM 773.

The FHWA standards required that the noise for the loudest hour of the day not exceed the appropriate "Design Noise Level". The Design Noise Levels are based on the sensitivity of the activities and purposes for which the land is used; these design levels and the corresponding land use categories are listed in Figure V-35.

In addition to the Design Noise Level standards, the FHWA also requires that the estimated future noise be compared with the existing noise environment. The purpose of this is to determine if there will be a significant increase or decrease in the ambient noise level. For this reason, an ambient noise measurement program was conducted. The results of these measurements were discussed earlier on the section on existing conditions (Section 2.3.2), and the data at each site is presented in Appendix H on noise.

#### 5.5.3.2 Impact Assessment

The extent of the noise impact for the arterial is shown by the noise contours. In general , the contours presented are for the combined noise from the rail operations as well as the arterial road.

In open areas, the region of impact - that is, the distance to the $L_{eq}$ 67 dB contour - is approximately 130 feet from the near edge of the arterial where it is six lanes wide and 90 feet where it is four lanes wide. In general there are no problems with impact because the area that is cleared is larger than 130 feet on either side of the proposed alternate railways.

FIG. V-35

DESIGN NOISE LEVEL/ACTIVITY RELATIONSHIPS

| Activity Category | Design Noise Levels-dBA $L_{eq}(h)$ | Design Noise Levels-dBA $L_{10}(h)$ | Description of Activity Category |
|---|---|---|---|
| A | 57 (Exterior) | 60 (Exterior) | Tracts of land in which serenity and quiet are of extraordinary significance and serve an important public need, and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose. Such areas could include amphitheaters, particular parks or portions of parks, or open spaces which are dedicated or recognized by appropriate local officials for activities requiring special qualities of serenity and quiet. |
| B | 67 (Exterior) | 70 (Exterior) | Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, picnic areas, recreation areas, playgrounds, active sports areas, and parks. |
| C | 72 (Exterior) | 75 (Exterior) | Developed lands, properties or activities not included in categories in A and B above. |
| D | -- | -- | For requirements on undeveloped lands see paragraphs 10a. and C. |
| E | 52 (Interior) | 55 (Interior) | Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums. |

## 5.6 Economic Development and Community Impacts

This section explores the respective impacts on economic development resulting from the two basic courses of action available: (1) allow existing conditions to continue, and (2) develop instead, a depressed rail-arterial road system in the Southwest Corridor. While other alternatives exist, their place on the scale of economic impacts will be found somewhere between the impact levels established by these two basic cases.

### 5.6.1 Continuation of Existing Conditions

The advantages and disadvantages of investment in a rail/transit arterial road project in the Southwest Corridor can only be assessed against the background of existing conditions, i.e., what would the future be without the new investment project. This course of action means that Orange Line service would be continued along the Washington Street elevated structure with stops as presently constituted. Automobile traffic would continue to use the combination of existing streets[1] for access to their destinations. Railroad traffic would increase with Amtrak and commuter rail service improvements on the existing embankment.

While short term safety and aesthetic improvements to the elevated structure will be made by the MBTA, they will not alter the basic impact of the structure on the Washington Street area. The unsightly presence of the structure, the unmitigated noise of passing trains, the poor light exposure of adjoining areas as well as the difficult traffic conditions created on the street below, have all combined to depress property values and greatly limit the redevelopment of the area. The deteriorated state of adjacent buildings as well as that of the local environment can be directly attributed to the existence of the "EL". Given a healthy mortgage market, the removal of the structure can be expected to initiate a general renewal trend in the Washington Street area, and a gradual return to its former state as a healthy residential and commercial street. The South Cove Urban Renewal Plan, for instance, anticipates the removal of the elevated structure in order to create a new development parcel for the Tufts New England Medical Center and associated new housing.

While depressed by the existence of the "EL", the communities through which it passes are not provided adequate transportation service by the system. The location of stations with wide spacing (up to 3/4 of a mile) is such that large sections of the community are left unserved. In the South End, the area around the Cathedral Housing Project has no station, nor does a station serve the new and existing housing and industry in lower Roxbury. Specifically, in Roxbury, the long distance between Dudley and Egleston leaves the Highland Park, Washington Park, and Bromley-Heath areas poorly serviced. The western part of Jamaica Plain is also not well served due to long walking distances to station stops at Egleston and Green Street.

Transverse bus service between the communities and the station stops on the present Orange Line is irregular, with as much as 30 minute waiting time between buses. In addition, free transfer between the bus and Orange Line is not provided. While the improvement of bus service is possible without the removal of elevated structure, the present level of street congestion caused by the structure makes any major improvement, such as exclusive right-of-way service, virtually impossible.

The removal of the Orange Line from its present location would reduce aspects of service to portions of the two communities it now services: South End and Roxbury. The provision of satisfactory replacement services are important to the neighborhoods' transportation system.

[1]Washington St., Columbus Ave., Tremont St., Sterling St., Ruggles St., Albany St., and Hampden St.

The base, or worst, case involving removal of the elevated would, however, consist of replacement of its service with revised bus service at frequent headways running the length of Washington Street from Downtown to Dudley Station. This base condition could easily be provided as an "exclusive right-of-way service" for its entire length if the City of Boston is able to implement its Washington Street Mall in the Downtown shopping district. The provision would provide adequate access to commercial businesses located on the street which now rely in some way upon high frequency access. It should be noted, however, that the provision of fixed rail transit service on Washington Street between the Downtown subway and Dudley Station has the potential of increasing the overall commercial viability of the street well above the existing and base cases because of the known preference of commercial markets to be near a modern surface rail facility. This service, if further extended southward, would have superior ability to enhance commercial strength because of the ability of passengers to view these commercial establishments from the vehicle but also to approach them more conveniently at a close light rail station spacing of about every second block. At Dudley Station itself much of the commercial district is some distance from the station. Distances of as much as 10 minutes walking time to the edge of the commercial area from the upper level platforms are now encountered.

It is projected, as a continuation of the current trend, that by 1980 ridership at existing Dudley Station will have fallen by about 10 percent and that approximately 75 percent of the boardings at the station will continue to be by passengers arriving by bus.

These passengers, because of the station's internal configuration and circulation pattern are not exposed directly to surrounding commercial uses. There is some evidence that indicates that few if any passengers transferring from the Orange Line to a bus use the stores in Dudley Square. Rather, it would appear that shoppers in the area primarily make purchases as the result of deliberate trips to the area for that purpose. These trips would be also accommodated by convenient bus routes through the square.

The physical presence and blighting influence of the "EL", which is both noisy (noise levels of up to 100 dBA on the ground) and dirty and keeps the Dudley Square area in darkness, and seriously impedes traffic flow, as well as problems of a local nature (parking, security, loss of local surrounding resident population) have caused great harm to the local economic climate for business. Removal of the EL, routing of convenient bus routes through the area (see Feeder Bus Systems, Section 5.1.4) traffic and parking improvements as planned by the City, and a concentrated effort to provide good coordination of merchant activities (as currently being pursued by the Dudley Merchants Assocation) should provide the most beneficial uplift to business. The surface replacement service would further raise the level of this uplift well between the current situation.

In spite of its present location at an Orange Line Station, Egleston Station has already lost most of its commercial base. In the Relocated Orange Line alternative bus routes would continue through Egleston to the Orange Line terminating instead at Jackson Square (see Fig. V-4).

As a consequence, the impact resulting from the removal of the station would be very limited. Provisions by local merchants for parking, street lighting and other improvements would more than offset these limited Orange Line impacts.

The relocation of Green Street Station one block to the west will have little impact on access to both businesses and residents. Removal of the "EL" will improve driver perception on Washington Street and general attitudes about the quality of the area. These factors should more than offset the small inconvenience of extra walking distance (about 800 feet).

Without the relocation of the Orange Line, the land cleared for the now withdrawn segment of I-95 South, would have little re-use potential and would continue to act as a negative influence upon the communities of Jamaica Plain and Roxbury. The re-use value of such vacant areas as well as that of adjoining vacant or underused privately owned parcels is dependent upon the provision of proper transit and motor vehicle access.

### 5.6.2 Development of the Rail Transit and Arterial Road System

Section 2.2.2.8 described the communities served by the realignment of the Orange Line to be characterized by high concentrations of unemployment. Perhaps the most important impact of the relocated Orange Line would be to make the core city more accessible for the inhabitants of these communities. This in effect, would increase the number of jobs available to them. This relative increase in turn, signifies an increased labor pool and consumer market for core city service organizations. Thus, the relocated Orange Line will tend to strengthen the concentration of service related activities in Boston's core while at the same time improving the job accessibility of the lower income segments of the City's population concentrated in communities adjacent to the new alignment. In addition the access provided to the commuter rail system at Ruggles Street and Forest Hills will provide "reverse" commutation opportunities to suburban locations from which bus connections could be provided to the 128 industrial park belt. Fig.V-36 demonstrates this increased accessibility. to transit station and commuter rail stops from specific public housing projects. Note that while the present Orange Line does not provide direct service to a single public housing project, the new relocated alignment offers direct service to the Whitter St., Mission Hills, Mission Hills Extension, Bromley-Heath, and Academy Homes projects.

New activities can be expected to develop within the communities transversed by the realigned Orange Line. New retail, service, and housing facilities will aggregate near the new station stops. The consolidation of the existing road system made possible by the proposed arterial street will make possible the regrouping of small parcels into larger more economic building sites. This parcelization of land and joint-development at stations is a major determinate of the Southwest Corridor Plan.

While the transit program can be expected to provide greater job accessibility for low income residents, to strengthen the service orientation of the core city, and to generate redevelopment in the communities transversed by the system, it alone will have little effect on the regional distribution of the City's population. In all probability it will neither strengthen nor reduce the long-run trend of migration out of the central city.

During the construction phase of the proposed relocated Orange Line, regional employment and income will experience short term (5 to 6 years) gains. Since the required work force will be large, the increase should assist in alleviating the growing unemployment in this sector, as described in Section 2.2.2.8 of this report. Section 7.3 examines in detail the impacts of construction investment.

Fig.V-37 summarizes the economic impact of the Southwest Corridor on the City of Boston as estimated by the Boston Redevelopment Authority Research Department. This table includes both construction and permanent jobs created by the transportation and land use elements, as well as the revenues to both city and state.

### 5.6.3 Effect of the Proposed Project on Property Values

The precise effect of the project on property value is difficult to estimate due to the high variability of very specific existing influences on particular parcels of property. It is possible, however, to present qualitative judgements of the overall effect of the project.

# SOUTHWEST CORRIDOR TRANSPORTATION IMPROVEMENTS

## ENVIRONMENTAL IMPACT ANALYSIS

MASSACHUSETTS BAY TRANSPORTATION AUTHORITY
MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS

## STUDY AREA

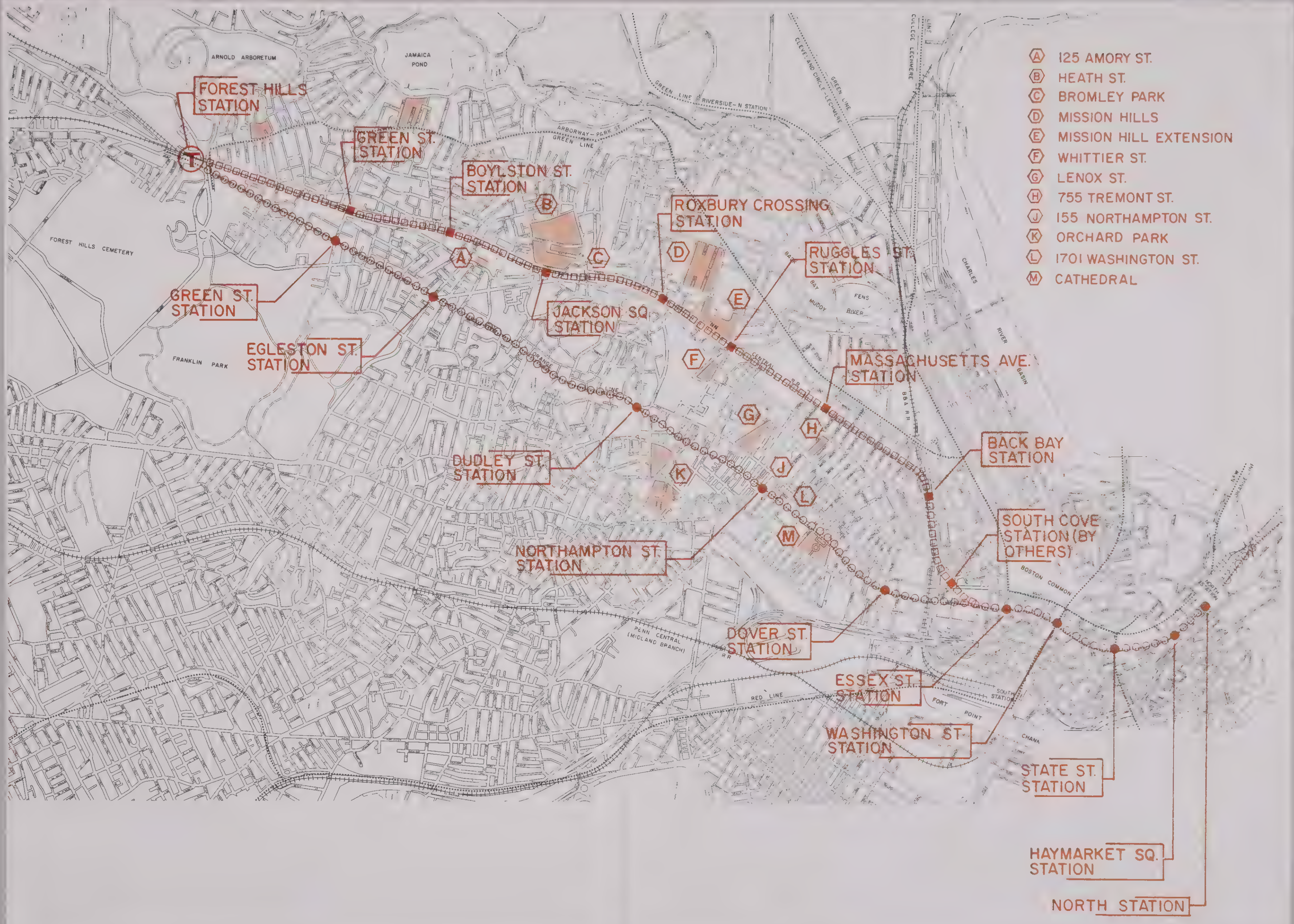
### PUBLIC HOUSING PROJECTS

### LEGEND

RELOCATED ORANGE LINE
EXISTING ORANGE LINE
PUBLIC HOUSING PROJECTS LOCATION & IDENTICATION

SCALE
0 1200 2400 3600

FIGURE
V-36



# Economic Impact of the Southwest Corridor on the City of Boston

| Development Potential | Residential | Industrial | Commercial/ Retail | Institutional[e] | Open Space/ Recreational | Transportation[g] | Other[f] | Total |
|---|---|---|---|---|---|---|---|---|
| **Land Area** | | | | | | | | |
| Square Feet (000's) | 1,675-1,579 | 862-988 | 591-624 | 315-372 | 903-1,143 | 7,311-6,881 | 285-287 | 11,942-11,865 |
| Acres | 38.5-36.1 | 19.8-22.7 | 13.6-14.4 | 7.2-8.5 | 20.8-26.7 | 167.8-158.0 | 6.5-6.6 | 274.2-273.0 |
| **Developed Space** | | | | | | | | |
| Square Feet (000's) | 1,306-1,211 | 487-507 | 250-260 | 15-70 | 903-1,143 | — | 165-287 | 3,126-3,478 |
| Dwelling Units | 1,306-1,211 | — | — | — | — | — | — | 1,306-1,211 |
| Hotel Rooms | — | — | — | — | — | — | 300 Rooms | 300 |
| Parking Spaces | — | — | — | — | — | — | 351-355 | 351-355 |
| **Investment** (000's) | | | | | | | | |
| Total | $52,014-48,190 | 8,028-8,366 | 8,965-9,350 | 1,800-16,800 | 1,129-1,429 | 463,305-447,705 | 7,746-7,749 | 542,987-539,590 |
| Public | $ 6,784-6,285 | 730-761 | 815-850 | 1,800-16,800 | 1,129-1,429 | 463,305-447,705 | 246-249 | 474,809-474,080 |
| Private | $45,230-41,905 | 7,298-7,605 | 8,150-8,500 | — | — | — | 7,500-7,500 | 68,178-65,510 |
| **Economic Impact** | | | | | | | | |
| Construction Phase | | | | | | | | |
| Jobs[a] | 1,803-1,670 | 278-290 | 263-271 | 62-581 | 39-49 | 16,037-15,497 | 268-268 | 18,750-18,626 |
| Wages (000's) | $23,406-21,685 | 3,612-3,764 | 4,033-4,207 | 810-7,560 | 508-644 | 208,487-201,467 | 3,486-3,487 | 244,342-244,724 |
| Permanent | | | | | | | | |
| Jobs[b] | — | 1,218-1,267 | 982-1,021 | 10-60 | 4 | 100 | 44 | 2,358-2,496 |
| Wages (000's) | $10,448-9,688 | 12,180-12,670 | 7,368-7,662 | 80-580 | 30 | 1,300 | 309 | 31,715-32,239 |
| Retail Sales (000's) | — | — | $17,500-18,200 | — | — | — | — | 17,500-18,200 |
| Population | 3,181-2,935 | — | — | — | — | — | — | 3,181-2,935 |
| **Tax Revenues Generated** (000's) | | | | | | | | |
| City | $2,669-2,473 | 574-598 | 642-669 | — | — | — | 669 | 4,554-4,409 |
| State | $ 522-484 | 180-183 | 1,005-1,045 | 4-33 | 1.75 | 64 | 16 | 1,792.75-1,826.75 |
| **Development in Area Immediately Adjacent to Corridor**[c] (000's) | | | | | | | | |
| Total | N.A. | N.A. | N.A. | $112,120 | 2,465 | N.A. | N.A. | 114,585 |
| Public | — | — | — | $112,120 | 2,465 | — | — | 114,585 |
| Private | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. | N.A. | — |
| **Development in Larger Area Surrounding Corridor**[d] (000's) | | | | | | | | |
| Total | $248,270 | 563 | 2,390 | 549,172 | 27,742 | 57,332 | 53,915 | 939,384 |
| Public | — | — | — | 357,224 | 27,742 | 57,332 | 53,875 | 496,173 |
| Private | $248,270 | 563 | 2,390 | 191,948 | — | — | 40 | 443,211 |

Note: The range is the result of extension or non extension of the Arterial through Jamaica Plain.

[a] Man-years

[b] Permanent positions

[c] Includes projects within one-half mile on either side of Corridor, North and South of Forest Hills.

[d] Includes following BRA Planning Districts: South End, Washington Park, Model Cities, Jamaica Plain, Hyde Park and Roslindale

[e] Includes the school, fire and police, library, hospital facilities and public building components of the City's ten-year Capital Facilities Program. The two largest program projects are the Campus High School and Boston City Hospital.

[f] Includes programmed urban renewal site improvements, infrastructure expenditures, 3-year water and sewer and municipal parking

[g] Includes rail bed to Route 128.

Source: Boston Redevelopment Authority Research Department

FIGURE V–37

Inasmuch as the first concern of the real estate appraisers is neighborhood location and environment, the impacts of the removal of the Washington Street Elevated (in the South End, Roxbury and Jamaica Plain) and the Penn Central embankment (in Jamaica Plain and Roxbury) would be beneficial to property values for the whole of each of the neighborhoods involved. Historically, values adjacent to such structures is lower than that of those located in areas outside of the immediate zone of the influence of noise and vibration, yet which are within the zone of higher accessibility permitted by the facility.

The consolidation of fixed heavy-rail facilities in the South End and Jamaica Plain in one corridor should increase property values for the neighborhood as a whole since these facilities now impact more than one area of each of these neighborhoods. The construction of the Southwest Corridor arterial street would result in the lessening of traffic on Columbus Avenue north of Ruggles Street and on Massachusetts Avenue in the South End. The arterial would reduce the amount of traffic on some residential streets and, therefore, its construction would be an incentive to higher property values for these local areas as well as the neighborhood as a whole.

In Roxbury and Jamaica Plain, better access to the cleared land parcels by transit and/or arterial and the additional attractiveness caused by creation of the Green Belt and removal of the embankment would increase the changes of development of these parcels, and therefore, value is much reduced without this access.

While the appropriate level of adequacy is hard to determine, in all cases, the provision of noise abatement measures is essential to the preservation of the value of existing habitable properties which directly abut the transit and rail facilities. Without such measures, value will probably decrease to some degree, though in this case, such properties are already of diminished value since they currently abut a major rail facility. If perceived noise levels remain the same or can be improved, values should not diminish significantly.

### 5.6.4 Local and Neighborhood Project Impacts - South End, South Cove, Back Bay, Fenway and Saint Botolph Neighborhoods

The proposed alternatives will have both primary and secondary impacts on the local community. Primary impacts are those effects immediately related to the rail facilities. These include transportation service to local residents, relocation of business or homes, changes in traffic and circulation patterns (both pedestrian and vehicular), disruption of community facilities, and some fiscal effects. Secondary impacts are more wide-spread and less easy to predict. They encompass changes such as alterations to development patterns and employment over the long term, and concomitant changes in social characteristics, neighborhood quality, and fiscal position (Sec. 6.6, Adverse Community Impact).

Between South End, South Cove, Back Bay, Fenway and Saint Botolph neighborhoods, major physical changes would take place at the two proposed station locations - Back Bay and Massachusetts Avenue' The Penn Central tracks are depressed between the communities, and will remain depressed with the new Orange Line tracks. Bridges over the right-of-way will be reconstructed to accomodate the new rail facilities at the following street crossings: Berkely Street, Clarendon Street, Dartmouth Street, WDst Newton Street and Massachusetts Avenue.

The Back Bay reconstruction is of major significance to the neighborhoods, becuase it would provide a major interconnection between the new rapid-transit line, and commuter-rail/Amtrack services. Access to the station for vehicles and pedestrians is therefore of prime consideration to the communities. It is anticipated that the present street pattern would be slightly altered on the bridges to permit improved access to the station. Existing one-way flow of traffic on Clarendon Street would not be altered. Station design would need to provide for access from both Clarendon and Dartmouth Streets.

Extensive realignment of tracks and platforms is contemplated for Back Bay Station. This means that the construction area will be somewhat wider than present trackage. This involves the acquisition and demolition of approximately eleven properties adjacent to the existing tracks - seven residential properties and four commercial properties. Only five of the seven residential properties are occupied for residential purposes, and two of them are completely vacant. One of the commercial structures is a one story metal shed used for dead storage adjacent to a larger primary structure. No other property takings would be required for the project. Relocation of the occupants of these structures would be an integral part of the construction program. Construction for the new Back Bay Station would take place within the modified right-of-way provided by property acquisition and the use of the right-of-way of Buckingham Street, which would be replaced over the rails upon completion of the project.

At Massachusetts Avenue, the project will include a station to serve the area of Symphony Hall, the Christian Science Center, the Boston Arena and the heavily used Massachusetts bus corridor. Symphony Station on the Green Line is close to the proposed alignment at this location and will be linked with the Relocated Orange Line with pedestrian connections at the surface. Bus access will be closely linked to both transit facilities, through provision for boarding and alighting on Massachusetts Avenue at both stations. Alignment restrictions probably dictate that the station be end-loading from Massachusetts Avenue. A pedestrian underpass on the northbound side of Massachusetts Avenue would be provided for direct access to the station. Another pedestrian bridge, over the rail facilities, would be provided at Camden Street with stairways to the station and the Boston Arena.

Development sites along this portion of the railroad right-of-way are somewhat limited due to intensive existing development. It would be possible to provide for air-rights construction over the tracks, in conjunction with noise barriers and decks, should that be desirable. Most of the probably development would take place adjacent to the tracks. One parcel at Massachusetts Avenue, which is presently vacant, could be developed immediately. However, significant development in the vicinity of Back Bay Station may occur on adjacent lands, stimulated by the construction of the proposed intermodal interchange at that location.

The Orange Line will provide a supplement to the service provided to the growing Back Bay business district by the Green Line Huntington Avenue trolley. The rapid increase of office space in the area in the recent past as well as the completion of the John Hancock Building will create further demand for transit service in the area.

No parking facilities are included in the alternative schemes adjacent to stations at Back Bay or Massachusetts Avenue. Care should therefore be taken to prevent motorists from parking in residential neighborhoods and then riding on the new facilities. This could be accomplished through signing of parking restrictions and adequate enforcement of existing and new parking regulations. Local streets leading to transit stations should also be provided with significant restrictions to prevent heavy volumes of traffic from using residential thoroughfares. Principal impacts on local streets would occur on the streets crossing the proposed right-of-way, and on certain north-south arteries leading toward stations, including such streets as Columbus Ave., and Tremont Street in the South End, and Huntington Avenue in Back Bay, and the Fenway. Revisions in the roadway widths and overall design of both Columbus and Tremont Streets have been in planning for some time, and should result in partial control of volumes which can safely traverse the South End. Huntington Avenue is also the subject of proposed improvements which would have the net effect of creating safe vehicular operations in an area which is not heavily residential.

No recognized individual buildings of historic significance, national or local, would be directly affected by the proposed alternatives. The South End is, however, comprised of a great many older homes, built row-house fashion and similar to the character of Beacon Hill and Back Bay residential neighborhoods. This area, which has been designated a National Historic District since May of 1973, has had substantial urban renewal activities to upgrade the housing stock and related community facilities. The proposed alternatives that include sound attenuation devices, landscaping and adequate urban design measures in all new construction should protect the character of the historic areas; the alignment would be depressed below surface grade, landscaping and high quality fencing would be provided, and stations are located in areas which are present nodes of heavy activity. (Refer to the review of Historic Properties in Appendix A.) Additionally, no community facilities would be impacted, only one public school is adjacent to the right-of-way. The existing school, which is a temporary structure, will be removed when the permanent Carter School is constructed a block away from the right-of-way.

### 5.6.5 Local and Neighborhood Project Impacts - Roxbury - Mission Hill

The proposed Relocated Orange Line would run between these communities in the area between Ruggles Street and Jackson Square. In this area, community impacts can become significant in the context of the two alternatives - the Modified Embankment and Depressed Rail Facilities.

The Modified Embankment alternatives would retain and alter the existing embankment for improved transportation service. Retention and modification to the embankment would result in significant impacts. First, the existing visual barrier would not be removed, but would in fact be enlarged in both vertical and horizontal dimensions. The addition of a continuous noise baffle along the top of the modified embankment would elevate its perceived height some 8 to 11 feet while at the same time reducing the potential noise impacts. The widening of the embankment would result in a larger physical separation between communities than presently exists. The cross streets passing under the embankment would be wider than at present, affording some degree of safety for pedestrians crossing the alignment and reaching the rapid transit stations. The net effect, however, is of an enlarged structure passing between neighborhoods. Secondly, the enlarged embankment would conceivably impact the marketability of the vacant land created originally for the expressway. The presence of the structure, even with noise reduction measures, may act to depress the utility of specific sites along the rail line, which would otherwise be more visible and useable for potential development. Thirdly, the reduction of noise through the use of noise baffle walls atop the embankment will not reduce the noise impact for those high structures which are located close to the embankment. While this is also true of the Depressed Rail alternative, there are few ameliorative actions that can be taken beyond provision of the wall in the Modified Embankment scheme. In the Depressed Rail scheme, by contrast, it would be possible to deck over seriously impacted areas, to totally eliminate the noise sources from affecting adjacent properties.

For both the Modified-Embankment and the Depressed-Rail alternatives, station locations in these communities would have improved access to adjacent neighborhoods. The station at Ruggles Street would serve the adjacent high-density publicly subsidized housing projects, as well as Northeastern University and the northern portion of the Campus High School. With the development of the cleared lands, the station would serve not only existing adjacent land uses, but several high-density uses proposed for adjacent sites. The Ruggles St. station, in the future, could become the intersection of the Relocated Orange Line, several realigned bus routes and the proposed cross-town circumferential services. This station will serve as a new focus for the heavily used bus services which now terminate at Dudley Square.

The station at Roxbury Crossing serves adjacent neighborhoods and the Campus High School. Bus shuttle service into the medical insitution area near Huntington Avenue could be effected from this location with additonal bus services connecting into Brookline and the Arborway and Riverside Green Lines. Some of these considerations are also true for the proposed station at Jackson Square, which serves not only portions of Roxbury and Mission Hill, but also the northern reaches of Jamaica Plain. Adjacent to Jackson Square are several large housing complex sites, most notably the Bromley Park and Heath Street projects. Bus service would reach the station from the Franklin Park area and from portions of Jamaica Plain and Mission Hill. The extension of Martin Luther King Boulevard, if implemented, would provide an additional route for bus services from the Washington Park area into Jackson Square Station.

Construction of new stations at Roxbury Crossing and Jackson Square would provide new impetus to development of the cleared lands of the corridor. In the Modified Embankment alternatives, however, the available parcels may be difficult to market because of the enlarged embankment. In the Depressed alternatives sites could be developed in conjunction with the rail stations, and perhaps could utilize certain portions of the air rights over the rails, if that becomes desirable. The available sites in the depressed-rail plan should be somewhat enhanced by the partial raising of grade and disposition of spoils which would elevate portions of the sites to grades more suitable for aggregation into large parcels for development. The Modified-Depressed alternatives require the raising of the grades of streets as they cross the rail/transit alignment to produce the required clearance above the tracks. This will cause cross streets to hump up, resulting in some visual discontinuity as one looks along the street. The Modified-Depressed alternatives also require further takings resulting from raising street grades near some buildings. Development opportunities are similar to those of the Depressed alternatives. Careful layout and disposition of lands should accommodate the one historic structure in the area - the Dudley House at 167 Centre Street.

Construction of a new arterial street would allow an increase in size of the cleared-land parcels to the east of Columbus Avenue. Construction of the street over the depressed relocated Orange Line between Roxbury Crossing and Jackson Square would allow a further substantial increase in the size of the development parcels that are located to the east of Columbus Avenue.

### 5.6.6 Local and Neighborhood Project Impacts - Jamaica Plain

Jamaica Plain would have four stations serving it instead of the present three. The new stations would be in the Penn Central right-of-way in which most of the available developable parcels in the neighborhood are located. Improved inter-modal connections at Forest Hills would expand transportation options for residents and would make the neighborhood more accessible to the region for purposes of recreation, shopping and employment.

Bus terminal facilities would be improved and a better connection of the Green Line to bus and Orange Line at Forest Hills would encourage ridership on the rapid/transit lines. Increased ridership at the southern end of the line would balance passenger loadings and encourage service improvements which would be generally beneficial.

Removal of the Washington Street elevated would have beneficial effects on most of the land uses along the street. Improved environmental conditions would be conducive to residential rehabilitation and new development. There would be a loss of business for some retail activities located at stations, however this would be offset by retail demand created at the new stations.

Local street congestion will worsen near the new stations while Washington Street congestion will be eased at Green Street and Egleston Square. Jackson Square and Forest Hills will be substantially changed, greatly improving them both functionally and visually. On balance, the neighborhoods will greatly benefit from environmental and traffic improvements around the stations. The plans for Green Street and Boylston Street Station incorporate minor traffic improvements in their immediate environs. Traffic densities on surrounding streets will increase because of station traffic. On-street all day parking by commuters will be a problem near the new stations just as it is now at Forest Hills. Increased enforcement, metering and a resident-sticker program are recommended to control this. A small commercial lot is planned at Green Street to replace the one now operating at the old Green Street Station. The Forest Hills Station is planned to incorporate a commercial parking structure accomodating between 500 and 1500 cars, depending on whether or not the Orange Line is extended along the Needham branch as far as Route 128. For a further discussion of parking impacts at Forest Hills see Appendix J. Generally speaking, the intention is to provide enough parking at Forest Hills Station to accommodate the demand for all-day parking, while closing some or all of the at-grade parking lots and returning on-street parking to short-term use by retail customers.

Alternative 1 - Depressed Rail - No Arterial

Depression of the rail facilities would have substantial benefits within the neighborhoods. The sense of isolation between neighborhoods would be greatly reduced. Passage across the corridor would become psychologically and actually easier and additional crossings and deckings would be relatively easy to construct in the future as conditions change. Landscaping and open-space activities would be visible to both sides of the right-of-way, doubling the visual benefits and making the areas safer because of the added surveillance. Improved noise characteristics and invisibility of trains would benefit adjacent land uses and improve neighborhood quality. However, in the Modified-Depressed alternatives, because of the higher elevation of the depressed-rail facilities, retaining walls and embankment would have to be constructed along certain local streets in the Jamaica Plain area.

The depressed rail facilities would permit a deck enclosure to be built over the tracks at Jackson Square and at McBride/Williams Streets - the site of the new Southwest II high school. This would further reduce acoustic impacts and therefore benefit adjacent land uses. Usable open space would also be increased at these critical locations. At a future date, some additional decking might be introduced elsewhere when changing conditions warrant it. It is conceivable that changing economics may permit building structures over the rail right-of-way in the future. These would most likely occur at or near the transit stations to take advantage of the transit access and the concentration of commercial and community facilities.

Redevelopment of vacant land is much more likely if the rail facilities are depressed because a depressed facility would improve conditions. This redevelopment could influence other property owners and lenders to make repairs and improvements. Negative impacts of uncontrolled vacant land would be eliminated.

Generally improved perceptions of neighborhood quality would favor establishment of labor-intensive enterprises, especially in underutilized buildings now existing in and near the corridor.

Depresssion of the rail facilities and associated primary beneficial effects would induce further neighborhood improvements over time. Long-run progressive neighborhood upgrading could eventually lead to substantial growth of property values and property tax revenues.

Joint development opportunities at stations will provide new and stronger retail services for the surrounding neighborhoods. Impact on existing neighborhood retail should be minimal since many residents currently do much routine shopping outside of the Jamaica Plain neighborhood. It is expected that the new retail facilities will tend to bring this business back rather than reduce existing neighborhood retail business.

Alternative 2 - Depressed Rail - Arterial Street East

The arterial will introduce a visual, physical and psychological barrier to cross-corridor movements, especially by pedestrians. At the same time it will reduce traffic on Washington, Amory Lamartine, Forest Hills, Columbus, Call, Chestnut, Centre and South Streets. This will have the effect of reducing visual, physical and psychological barriers. Traffic signals with pedestrian walk lights will be provided at major intersections along the arterial. The overall effect on a person traversing the neighborhood east to west would be moderate easing of conflicts at three to five north-south streets, with a major new conflict introduced by the new arterial.

Vehicle circulation will be eased within neighborhoods by the general reductions of local street traffic. East-west crossings of the arterial will have added difficulty and waiting times at traffic lights. Some trips into or out of the neighborhoods and within the neighborhoods will be facilitated by using part of the arterial. Trips to Orange Line stations will be eased by the added option of the arterial.

The arterial will be relatively unsightly compared to the no arterial option. It will carry some bus and truck traffic since it is intended to remove them from other neighborhood streets. The land area available for landscaping will be reduced by the pavement width.

Traffic on the arterial will generate noise and air pollution which will affect adjacent land uses. At the same time traffic reductions on other neighborhood streets will reduce noise and air pollution in those areas. The arterial street traffic noise will affect new development to the extent that counter-measures such as double glazing or setbacks may be needed, however, development will not be prohibited.

The improved local access provided by the arterial will help to make new development more marketable. Visibility of development parcels will be greatly improved. This approach to them will be more direct and easily explained to persons not familiar with neighborhood street patterns. The arterial will also facilitate movement of service vehicles. Police patrol surveillance of open space and new development parcels will be greater than under the no arterial alternative. Police, fire and ambulance access throughout the Jamaica Plain area will be made easier, safer and more rapid. Delivery vehicles, oil delivery trucks, trash removal trucks, moving vans, etc. all will spend less time on residential streets because of the opportunity to enter and leave the neighborhood on the arterial.

The presence or absence of the arterial should not materially affect the problem of all-day parking by commuters. Parking will not be allowed on the arterial. The arterial will not alter the propensity to drive vs. ride since it is designed as a replacement for existing routes.

Through traffic reductions on Washington Street combined with the removal of the elevated structure should permit its conversion to a very attractive and relatively quiet street accommodating neighborhood retail uses.

The arterial will make truck access to neighborhood businesses somewhat easier. This may forestall some employment losses or create some additional employment.

Retention of the embankment plus the added height for bridge clearance and noise barriers would make the visual barrier effect even worse than it is at present. Neighborhood divisions would continue. Wider openings at underpasses and stations would make transverse movements easier and more pleasant. This, however, is not as good as open-air bridges over depressed rail. A drawback of underpasses with an embankment is that the rumble of a train overhead is quite loud and begins with little or no warning for a pedestrian. The problem is not extreme, but adds to the discomfort of neighborhood residents.

Vehicle crossings can be as numerous as with the depressed scheme, however, it is virtually impossible to add a crossing in the future. Pedestrian crossings independent of vehicle crossings are undesirable since they are so shielded from view that they present unacceptable risks to personal security. The only exclusively pedestrian underpass under any alternative would be the Minton Street/Lawndale Terrace passageway. This underpass currently exists and it would be retained and lengthened under alternative three.

The embankments and retaining walls would be cleaned up and landscaped under Alternatives 3 and 4. It cannot be guaranteed that they would always be meticulously clean and well groomed. By nature these are borderline areas between jurisdictions and each party tends to feel that the other is responsible for any defacement, dumping, lack of care, etc.

The noise effects of the embankment alternatives would be more severe than with the depressed alternatives. Noise walls and roadbed improvements would make peak noise somewhat less than at present, but average noise would be as bad as at present or worse because of increased frequency of train movements. As a result, neighboring vacant land would be unattractive for residential redevelopment. Industrial or commercial development might be possible at some points, however land-use incompatibility or lack of arterial street access might preclude even this. Open space uses could be visually attractive, but active use would be unpleasant because of noise and shadowing in morning or afternoon. Security would be a problem because open space would have less surveillance from nearby residents.

Generally speaking, the land use benefits along Washington Street would be realized under this alternative, however, underutilization and decay would remain a problem along the Penn Central alignment. Conditions might even deteriorate further depending on other external factors.

<u>Alternative 4 - Embankment - Arterial Street West</u>

This would combine the effects of Alternative 3 with many of the effects of the arterial described under Alternative 2. Visual and transverse movement obstruction would be severe. Vehicular and pedestrian crossings would be added between Atherton and Boylston, at Minton Street, and just north of Forest Hills. This would mitigate the barrier effect somewhat.

The placement of the arterial on the west side of the embankment would reduce the size of several useful land parcels substantially while creating numerous long narrow land parcels on the east side. These would not be very useful and would be hard to maintain. The eastern parcels would be invisible from the arterial and several would have very poor surveillance from residential areas thereby making them unsafe.

The pedestrian underpass between Minton Street and Lawndale Terrace would be superseded by a vehicle and pedestrian underpass at Minton Street. This would reduce the currently existing hazard to personal safety.

Improved vehicular access would not have the same land use benefits described under Alternative 2 because the environmental problems of the embankment and the reduced parcel sizes would tend to discourage development in spite of access benefits.

On balance, this alternative is likely to continue stagnation of land usage and is unlikely to stimulate the neighborhood upgrading and new development possible with Alternatives land 2.

Alternative 5 - Modified Depressed - Arterial Street East

This alternative will have the same neighborhood impacts as the fully depressed arterial street east alternative except for the following:

- The trains will not be as deeply depressed. This will increase noise impacts somewhat. Catenary wires will be at or above eye level instead of below it, and trains will be visible. Air rights construction and future added crossings will be much more difficult to accomplish.

- The cross streets will have to be raised to clear the rail/transit alignment. This will cause the cross streets to hump up, resulting in some visual discontinuity as one looks along the street.

- The arterial street will have to be raised to meet the cross streets. This will create a visual barrier along the right-of-way. Much of the open space strip along the arterial will have to slope down to the existing grade.

- Several additional full or partial takings will be needed in order to accomodate the new street profiles. In addition, a number of properties will have to be physically altered to meet the new street profiles, even though they will not have to be taken.

Alternative 6 - Modified-Depressed - No Arterial Street

This alternative will be similar to alternative 5 except for the absence of the arterial street. This will permit excess land percels to be graded more nearly level with surrounding land except near cross street. The visual barrier effect will be less than that with alternative 5, however the raised cross streets will still present visual obstructions.

Land takings and property alterations will be nearly the same as for alternative 5 since most of these are required for the cross streets.

5.6.7 Local and Neighborhood Project Impacts - Land Acquisitions

In addition to land originally acquired and cleared for I-95 South in the Southwest Corridor, additional parcels, depending on the alternative, are required for proposed construction in this project (see Figure V-38). However, not all the land originally acquired and cleared would be needed for the construction. The proposed land use for the residual parcels already acquired or to be acquired is covered in Section 7.4.

As shown in Fig. V-38, the Modified-Depressed Alternative, FH-5 (combining with Alternative SC-1) would have the most acquisitions. They include 13 full commercial takings and 17 residential takings which would have to be relocated (partial takings listed need not be relocated).

Of the 13 full commercial takings, three are in used-car sales, auto parts or wrecking (junk yard) businesses. The American Legion Post #76 located on Arborway and the Garmet Lounge on Columbus Avenue in Back Bay would involve transfer of liquor licenses.

The three full residential takings in the Back Bay area consist of a multi-family apartment building and two row-houses. The latter would involve demolition of sections of adjoining row-houses. The end walls exposed after demolition would be strengthened and the residual area properly landscaped.

On the other hand, the combination of SC-2 and FH-3 would have the least amount of takings - three full commercials and one full residential.

(FIG. V-38)

PROPERTIES TO BE ACQUIRED

| A L T E R N A T I V E S | | P R O P O S E D   A C Q U I S I T I O N S | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Private-Commercial | | Private-Residential | | Public | | Vacant | |
| South Cove to Camden St. | Camden Street to Forest Hills | Full | Partial | Full | Partial | Full | Partial | Full | Partial |
| NB-1 | NB-1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| - | FH-1 | 2 | 4 | 0 | 3 | 3 | 2 | 0 | 0 |
| SC-1 and | FH-1 | 5 | 6 | 3 | 3 | 5 | 4 | 0 | 0 |
| SC-2 and | FH-1 | 3 | 4 | 1 | 3 | 3 | 3 | 0 | 0 |
| - | FH-2 | 4 | 7 | 0 | 5 | 3 | 2 | 0 | 0 |
| SC-1 and | FH-2 | 7 | 9 | 3 | 5 | 5 | 4 | 0 | 0 |
| SC-2 and | FH-2 | 5 | 7 | 1 | 5 | 3 | 3 | 0 | 0 |
| - | FH-3 | 2 | 2 | 0 | 0 | 3 | 3 | 0 | 0 |
| SC-1 and | FH-3 | 5 | 4 | 3 | 0 | 5 | 5 | 0 | 0 |
| SC-2 and | FH-3 | 3 | 2 | 1 | 0 | 3 | 4 | 0 | 0 |
| - | FH-4 | 3 | 5 | 0 | 2 | 3 | 4 | 0 | 0 |
| SC-1 and | FH-4 | 6 | 7 | 3 | 2 | 5 | 6 | 0 | 0 |
| SC-2 and | FH-4 | 4 | 5 | 1 | 2 | 3 | 5 | 0 | 0 |
| - | FH-5 | 13 | 10 | 15 | 8 | 5 | 4 | 6 | 1 |
| SC-1 and | FH-5 | 16 | 12 | 18 | 8 | 7 | 6 | 6 | 1 |
| SC-2 and | FH-5 | 14 | 10 | 16 | 8 | 5 | 5 | 6 | 1 |
| - | FH-6 | 10 | 8 | 15 | 8 | 5 | 4 | 6 | 1 |
| SC-1 and | FH-6 | 13 | 10 | 18 | 8 | 7 | 6 | 6 | 1 |
| SC-2 and | FH-6 | 11 | 8 | 16 | 8 | 5 | 5 | 6 | 1 |

NOTES TO TABLE (FIG. V-38)

Full Acquisition - business or residence to be totally acquired (relocation of residents required)

Partial Acquisition - business or residence to remain

Public - public land owned by City or State

Vacant - vacant lot with or without abandoned building

NB-1 - No-Build - no rail/transit and no arterial street

SC-1 - depressed rail/transit with minimum grade adjustment, South Cove to Cameden Street

SC-2 - depressed rail/transit with Orange Line in tunnel to Dartmouth Street, South Cove to Camden Street

FH-1 - depressed rail/transit, no arterial street

FH-2 - depressed rail/transit, arterial street east

FH-3 - rail/transit on modified embankment, no arterial street

FH-4 - rail/transit on modified embankment, arterial street crossing east to west

FH-5 - modified depressed rail/transit, arterial street east

FH-6 - modified depressed rail/transit, no arterial street south of Jackson Square

 76.1

## 5.7 Visual Impacts

In its present configuration, the Penn Central Rail Corridor constitutes a sizeable barrier to community continuity. Passing through the South End and St. Botolph areas, the Rail Corridor is slightly below grade; through Lower Roxbury, the tracks begin their rise to the 20 ft. high embanked elevation at which they pass through Roxbury and Jamaica Plain.

The existing Rail Corridor constrains access between a series of residential communities along its length by severly limiting passage between them. Various pedestrian tunnels (in Roxbury and Jamaica Plain) and bridges (in the South End and St. Botolph areas) provide access between divided neighborhoods, but in the context of urban life, these often represent dangerous situations that invite crime. In the segments where the tracks are raised on an embankment, communities are further denied visual access from one side to the other. This situation further encourages crime and contributes to the decline of residential neighborhoods by creating unobserved and unusable areas.

In the modified embankment option, the existing track bed would be raised several feet and the entire embankment widened. The additional width, as well as the increased vertical dimension (due to sound attenuation devices and overhead power supply systems) will extend the existing shadow pattern over land adjacent to the embankment, detracting somewhat from the desirability of these parcels as potential development sites. In a depressed option, shadows obviously would not be an issue and in fact the removal of the embankment brings sunlight to numerous parcels which for years have been negatively impacted by the shadow of the current embankment.

The character of the residential neighborhoods which abut the existing embankment varies from occasional high density housing (Bromley Heath, Mission Hill) to single and multi-family residences, the predominant housing type. The present rail corridor and embankment is an unavoidable intrusion to the intimate scale and desirable character of these residential districts.

In the depressed options, the great bulk which the embankment represents is not a factor; still the discontinuity that a large open depression presents must be addressed in design of the facility.

Removal of the barrier effect of the embankment would join neighborhoods which have essentially the same ethnic and economic characteristics across the tracks. The two portions of Roxbury would join each other; likewise the two portions of Jamaica Plain would be connected. This impact is seen as entirely beneficial.

In Roxbury, the isolation of the Mission Hill and Bromley Heath Housing would be largely eliminated. Its residents would have access to the facilities to be located in the Southwest Corridor and particularly would be in close proximity to the open space facilities provided adjacent to the transportation elements.

Views of Roxbury Highlands from Mission Hill and vice versa would be possible. Access to the underutilized Connolly Playground, for example, would be opened to Bromley Heath residents who have inadequate open space - they would also be provided with open space at an expanded Albert Street playground over the depressed rail alternatives.

In Jamaica Plain connectives between schools and playgrounds would be afforded residents now cut off from them. This is particularly vital for those who live in the smaller portion of Jamaica Plain between the railroad and Washington Street. The small size of this neighborhood has tradtionally handicapped it without adequate facilities and city services.

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## 6.0 UNAVOIDABLE ADVERSE IMPACTS OF PROJECT ALTERNATIVES AND MEASURES TO REDUCE THEIR IMPACT

### 6.1 Adverse Transportation Impacts

Transporation impacts which may be adverse can be categorized into two elements: those dealing with surface-street traffic and local circulation, for the life of the project and those dealing with traffic-flow patterns which are temporarily altered during the construction process. The following sections provide a detailed explanation of these two impact categories.

#### 6.1.1. Traffic and Local Circulation

The potential adverse transporation impacts of the project would primarily affect traffic and circulation in the vicinity of the stations. However, most of the stations serve only local traffic or bus-feeder lines. The exception would be Forest Hills, which is located at a major intersection of arterial streets serving the Southwest areas of Hyde Park, Roslindale and West Roxbury. The location of the station at Forest Hills would draw additional bus and auto traffic on Washington Street, Hyde Park Avenue, and Morton Street. It is anticipated that this traffic would be accommodated on a series of street improvements made possible by the removal of the elevated transit lines, and through proposed parking facilities.

Though auto dropoff would be provided at several of the stations, it is anticipated that this would not cause serious congestion on local streets. This is particularly true of the station locations at Green Street and Boylston Street in Jamaica Plain. Auto dropoff facilities at the other stations would be combined with the provisions for bus boarding and unloading adjacent to the stations. In large-volume stations, such as Forest Hills, the auto-dropoff and bus-loading areas may need to be separated because of anticipated higher volumes of traffic.

On-street parking would also be a problem under all of the station alternatives, as some people would try to park in the vicinity of the stations either to avoid paying the fees at parking lots, or as an alternative as parking areas became full. This increased on-street parking would make the streets less pleasant, hamper traffic flow, and make parking more difficult for local residents. To keep regional transit users from parking on local streets, the communities will need to work with city agencies to enact restrictions and provide enforcement limiting on-street parking to residents only.

Walk-in patronage at the stations would cause more pedestrian traffic in the local areas and more crossing of local streets. While this walk-in patronage would generally reinforce the commercial space in stations nearby, it is recommended that pedestrian-operated crossing signals be installed as part of the pedestrian access facilities, and that access to the rapid transit be provided from both sides of the street where possible. Pedestrian circulation can be a major improvement over the present conflicts at stations on the elevated, such as Northampton, Dudley and Forest Hills.

#### 6.1.2. Traffic Flow

A detailed discussion of traffic flow as it relates to the various alternatives including changes in traffic volume as related to the different alternatives is presented in Section 5.1.6 Arterial Street Impacts.

## 6.2 Adverse Construction Impacts

### 6.2.1. Movements of Materials and Equipment

To the extent possible, material and equipment would be moved by rail in order to reduce the impacts associated with street movements. Obviously once the rail system between Forest Hills and Back Bay is removed, such rail movement will be impossible. However some material may be ordered early, delivered by rail during demolition-excavation and stockpiled at key points along the route. Other material and equipment would be trucked in on existing arterial streets.

Contracts 2 and 3 of the Depressed alternative are structured so that each includes the excavation and disposal of approximately 1,500,000 cubic yards. The use of trucks to haul this quantity of material through the Corridor neighborhoods would likely be unacceptable to the community. Railroad hauling appears to be a viable alternative. With the Modified depressed scheme the amount of material to disposed of off site is reduced to a total of 500,000 cubic yards. The method of removal would be similar to that described below.

The material from Contract 3 could be hauled to the south over the Shore Line with the capability to divert over numerous branches. The material from Contract 2 could be loaded out to the north with unit trains switching onto the Boston and Albany tracks at Back Bay, by way of a temporary cross-over. This train could then be taken out to Beacon Park yard, across the Charles River via the Grand Junction into the Boston and Maine system for haul to a northerly disposal area. Debris from demolished bridges, walls, etc. could be moved in the same way.

Utilizing unit trains of gondola cars and charging hoppers, this system would provide the capability to load-out and haul excavated material to the north, west or south. The contracts are so divided that each contractor may operate freely without interference from the other.

A large quanitity of construction material, such as sheet piling, drainage, culverts, track ballast, ties, could be delivered to the job site by rail. Heavy earth-moving equipment and cranes could also arrive by railroad.

### 6.2.2. Spoil Disposal

#### 6.2.2.1 Statutes and Regulations

There are certain state statutes and local regulation procedures which will apply to the process of disposing of the spoil.[1] These may be briefly described as follows:

a. Should any person, whether a public agency of the Commonwealth or of a city or town, as well as private parties, such as contractors, seek to dispose of the material in a way that will affect areas covered by the Commonwealth's General Laws, Chapter 131, Section 40 (a landmark statute in the United States and known popularly as the "Hatch Act"), a very stringent set of reviews and controls will apply. Under these provisions any person who removes, fills, dredges or otherwise alters any "bank, fresh water, wetland, coastal wetland, beach, dune, flat, marsh, meadow or swamp bordering on the ocean or on any estuary, creek, river, stream, pond or lake, or any land under said waters or any land subject to tidal action, coastal storm flowage or flooding" must file a notice of intent to take such action with the appropriate local conservation commission, must present his proposal in a public hearing before the commission, and must follow an order of restrictions that may be applied by the local commission or on appeal by the State Department of Environmental Quality Engineering (the successor agency to the Department of Natural Resources under the reorganization of agencies within the Executive Office of Environmental Affairs). These provisions are key in protecting environmentally sensitive areas throughout the Commonwealth, including but not limited to lands bordering on public water supplies.

[1] "Excavated material (dirt, rock, debris) which must be disposed of away from the job site"

The MBTA has indicated to the Department of Environmental Quality Engineering that it will require its contractors to dispose of spoil only at sites approved in ordinance by D.E.Q.E.

b. The disposition at the dump site of certain of the spoil material will be covered by regulation of the local board of health pursuant to General Laws, Chapter 111, Section 150A. Under that law, any person, public or private, including municipalities, must obtain a board of health permit to locate, establish and operate a "refuse" disposal facility, and must operate such facilities in accordance with health regulations. For the purpose of these regulations, "refuse" is defined as "all solid or liquid-waste materials, including garbage and rubbish, but not including sewage." Further, regulations issued by the Department of Public Health under this statute with respect to sanitary land fills define "solid waste" as any "unwanted or discarded solid material." In short, all of the spoil material that is unwanted or discarded as non-reusable material is covered as "refuse" under this statute. This would include the clay and fill materials that are not transported to sites for re-ues, as well as the silt that is not to be re-used.

Moreover, in cases where disposal at a sanitary landfill is contemplated, there are strict regulations concerning the establishment and use of those sites. In addition, to provisions for site selection and preparation, the regulations provide operating requirements including cover materials that will not attract rodents, flies, or other pests, which will not erode, and which will provide a seal and cover sufficient to support vegetation. The regulations also require fire protection and prevention procedures and adequate access controls. A key element of the regulation is the requirement that the operator of the landfill site provide a layer of at least six inches of compacted cover at the end of each day's operations.

Finally, the Department of Environmental Quality Engineering is required under Section 150A to approve the proposed uses as well as the plans and designs for refuse disposal facilities. It has always been the policy of the Department to require that refuse-disposal sites, including sites for the disposal of materials such as the embankment spoils, meet the requirements for sanitary landfill.

c. The disposition of all of the spoil material, whether treated as "refuse" under the above regulatory system, or as material for re-sale or other re-use, is covered by local zoning codes promulgated under authority of General Laws, Chapter 40A. Under this statute, cities and towns may regulate the location and establishment of a public or private dump. This power and the validity of zoning ordinances prohibiting the use of land for public or private dump sites without the approval of certain city or town authroities (e.g., board of alderman, building commissioner, board of appeals, as well as the board of health) have been upheld in the Commonwealth.

d. In cases where a person collects and transports "offensive" substances, he must obtain a permit from local boards of health pursuant to General Laws, Chapter 111, Section 31A and 31B or, in cases where he transports but does not collect such substances, he must follow health regulations issued for that purpose. In light of the intent of this statute, which is to protect the public health, and in light of the mandate of the Massachusetts Environmental Policy Act, General Laws, Chapter 30, Section 61, that "unless a clear contrary intent is manifested, all statutes shall be interpreted and administered so as to minimize and prevent damage to the environment," it is likely that the term "offensive substances" in Section 31A would be interpreted broadly. If spoil material removed from the project falls within the limits of "offensive substances," the contractor carrying such substances would be obligated to follow regulations issued under Sections 31A and 31B. In any event, the MBTA could provide in its contract specifications that the transport and

disposition of such substances as part of the project spoils should follow such regulations as may apply under this statute.

e. It is not anticipated that any of the spoils materials will involve polluted or hazardous substances. However, should any of the removed materials be found to be "hazardous" substances or wastes within the meaning of General Laws, Chapter 21, Sections 57 and 58, their removal and disposition will be controlled under a highly stringent set of regulations issued by the Hazardous Waste Disposal Board (within the Department of Environmental Quality Engineering, Executive Office of Environmental Affairs).

The regulations define the substances that are covered, specify the means of disposal, including a process for the careful selection of disposal sites, and set license and inspection fees. The key provisions are those which, following the statutory standard, define hazardous wastes as "substances which because of their chemical, radioactive, flammable, explosive or other characteristics, constitute or may reasonably be expected to constitute a danger to the public health, safety or welfare or to the environment." Special restrictions in the regulations apply to the disposal of hazardous substances in any waters of the Commonwealth. Moreover, the regulations provide that the Division of Water Pollution Control must issue a license to any person handling or disposing of hazardous wastes, and must also approve the land site at which certain of the wastes are to be disposed. Disposal sites must at a minimum meet the requirements of the Sanitary Landfill regulations, which are discussed above.

f. In regard to the enabling act for the MBTA, General Laws, Chapter 161A, Section 3(i), the Authority may in fact be exempt from the local health or zoning regulations or by-laws described in paragraphs b. and c. above. The relevant statutory language provides that "except as otherwise provided in this chapter, the directors of the authority shall determine the character and extent of the services and facilities to be furnished, and in these respects their authority shall be exclusive and shall not be subject to the approval, control or direction of any state, municipal or other department, board or commission."

However, assuming that this exemption applies to the Authority the exemption is not interpreted to run to the Authority's private contractors. In recognition of this, contracts between the MBTA and their construction contractors require that the contractor obtain all necessary local licenses and permits and that they otherwise comply with local by-laws.

The Authority does not interpret Section 3(i) of its statute as exempting it from provisions of state law authorizing regulation by the state in the interest of protecting the public health or the environment e.g., the "Hatch Act" or the Massachusetts Environmental Policy Act, General Laws, Chapter 30, Sections 61 and 62.

#### 6.2.2.2 Spoil Disposal

The earthmoving schedule as described in Section 5 allows that spoil could be hauled off the job site by rail to both the north and south. The MBTA has committed itself to disposal at sites approved by the Department of Environmental Quality Engineering. This method of controling disposal would insure the environmental protection of any area in which such disposal were contemplated.

### 6.2.3 Interruption of Utilities

Utility relocations would be so designed and their construction so scheduled that it will be possible to maintain services during construction. For example, the Stony Brook Conduit crossings would be relocated away from their

existing crossing locations. This would permit the existing conduit to function during relocation work. Other major utilities would be hung on adequate supports until placed in their final location.

Careful planning and construction staging would reduce the possibilities of utility interruptions. However, there may be occasions where some short-term interruption of utility services cannot be avoided.

### 6.2.4 Traffic Flow

Local traffic disruption is likely to occur during the construction of any of the alternatives. This is unavoidable with projects of the size suggested in the Southwest Corridor. Disruptions that are most likely to occur are associated with utility relocation, bridge structures, and reconstruction of existing streets. A detailed description of traffic flow during construction for each alternative is presently in Section 5.2.5.4 Traffic Flows. Either temporary by-pass roadways would be used where local conditions would permit or appropriate detours would be established to guide motorists to adjacent bridges.

Utility-relocation work is generally localized in the area of major structures. To minimize the disruptive effect of such work, efforts would be made to coordinate the various utility companies at the time final construction plans became available. The contractors doing the relocation work would be expected to schedule their work to assure that all necessary materials were on hand prior to making street openings. Where necessary, utility trenches would be covered with street plates, particularly during morning and afternoon peak hours, to minimize the disruptive traffic impact.

### 6.2.5 Pedestrian Movements

The construction impacts on pedestrian movements are discussed in Section 5.2.5.5 Pedestrian Movements for each of the alternatives. These adverse impacts would be of minimal nature because temporary pedestrian crossings would be used where possible and the construction-time interval would be made as short as possible.

### 6.2.6 Noise During Construction

The noise emitted by construction operations is regulated by a number of Federal, state and local laws. The Federal Highway Administration requires that construction noise be considered in the Environmental Assessment stage of the project. Federal Highway Program Manual 773 requires the following:

1. Identify land uses or activities which may be affected by noise from construction of the highway. The identification is to be performed during the project development studies.

2. Determine the special provisions which are needed in the contract documents to minimize or eliminate adverse construction noise impacts to the community. This determination shall include a weighting of the benefits achieved and the overall adverse social, economic and environmental effects and costs of the special provisions.

3. Incorporate the needed special provisions in the contract documents.

The Environmental Protection Agency has recently promulgated regulations requiring that new trucks and air compressors comply with certain noise limits.

The Urban Mass Transit Administration has no construction noise regulations. regarding the construction of a rapid-transit system, but usually relys upon the regulations of other agencies to limit construction noise.

Noise levels at the construction site will also be limited in terms of a workers exposure to noise. These limits are set by Occupational Safety and Health Administration and presently require that a workers 8 hour dosage of noise not exceed an $L_{eq}$ of 90 dBA.

The Massachusetts Department of Public Health mentions construction and demolition noise in regulation 10.

As a policy matter, the Department of Public Health suggests that all equipment be well muffled and that construction be limited to daytime hours.

The Boston Air Pollution Control Commission has specific regulations concerning construction noise. Noise regulations 4 and 6 limit construction noise levels for various land uses and set a limit of 85 dBA at 80' for all construction equipment except pile drivers.

### 6.2.7 Air Quality Controls During Construction

State air pollution-control regulations provide a basis for requiring emission controls of fugitive dust from construction activities. The applicable regulations are listed below:

Regulation 1: No person owning, leasing, or controlling the operation of any air contamination source shall willfully, negligently, or through failure to provide necessary equipment or to take necessary precautions, permit any emission from said air contamination source or sources of such quantities of air contaminants which will cause, by themselves or in conjunction with other air contaminants, a condition of air pollution.

Regulation 9.3: No person shall cause, suffer, allow, or permit a building, road, driveway, or open area to be constructed, used, repaired, or demolished without applying such reasonable measures as may be necessary to prevent particulate matter from becoming airborne that may cause or contribute to a condition of air pollution.

The adverse effects of construction activities on air quality will be minimized using all reasonable controls. Excavated material where possible would be hauled out principally by rail, not truck, using covered gondola cars for all material capable of releasing fugitive dust emissions. In addition, appropriate chemicals will be used to cover dust-producing operations during construction.

The air quality impacts associated with heavy-duty construction equipment used in excavation and landfill activities can be indicated best by examining the average emissions of a diesel-powered wheeled bulldozer used in construction. Emission factors for this type of equipment have been developed by EPA* and are given in terms of grams of pollutant per hour of operation. These emission factors are compared in Fig. VI-1 with corresponding factors for an average motor vehicle in the Southwest Corridor (in 1975) traveling at 20 mph. The results indicate that one bulldozer emits less carbon monoxide and hydrocarbons, but more nitrogen oxides, sulfur oxides, and particulates than one motor vehicle. Tables also presents a ratio of the emission factors giving the equivalent number of motor vehicles for the emissions of each pollutant from one bulldozer. These results indicate that even if a large number of heavy-duty construction machines are operated simultaneously in the Southwest Corridor, their total emissions would be insignificant compared to that generated by the large volume of motor vehicles that travel in the Southwest Corridor daily.

*Compilation of Air Pollutant Emission Factors, U.S. Environmental Protection Agency, Publication No. AP-42, Second Edition, (including Supplements 1-5). Research Triangle Park, North Carolina, 1975.

Figure VI - 1

COMPARISON OF AVERAGE EMISSION FACTORS FOR

BULLDOZERS AND MOTOR VEHICLES IN

THE SOUTHWEST CORRIDOR (grams/hour)

| Criteria Pollutant | Bulldozer | Motor Vehicle | Ratio (B/MV) |
|---|---|---|---|
| Carbon Monoxide | 340 | 970 | 0.35 |
| Hydrocarbons | 110 | 120 | 0.92 |
| Nitrogen Oxides | 2300 | 82 | 28.0 |
| Sulfur Oxides | 160 | 5.2 | 31.0 |
| Particulates | 75 | 17 | 4.4 |

6.2.8 Commercial Disruption, Amelioration

The retail area on Hyde Park Avenue at Forest Hills should have short-term parking areas for customers and construction-worker parking would be provided elsewhere. Traffic flow should be maintained on Hyde Park Avenue. The temporary Orange Line station would be constructed to maintain as much retail patronage as possible.

Traffic flow on Washington Street should be maintained if at all possible. Similarly, Arborway trolley service should be maintained and should terminate as close to the Orange Line station as possible.

Street access should be maintained in the Boylston Street and Green Street areas. Airborne noise and dust can be controlled somewhat, however, some of it is unavoidable. Scheduling of certain work in late fall through early spring may help mitigate some impacts which would be most objectionable when windows are open.

If the arterial street is to be built, sections could be in operation before certain planned street closings occur. This would help to maintain access and minimize loss of patronage. Access for fire and emergency vehicles is also a consideration here.

Removal of the Washington Street elevated should be accomplished expeditiously. Vehicular access to all properties should be maintained even if on a restricted basis. Certain truck-dependent activities such as warehousing, food and liquor stores should be contacted and given maps of recommended access routes which they, in turn, would give out to truckers. This would help control extra truck traffic on neighborhood streets. Between Forest Hills Station and McBride Street, there would be no good alternate to Washington Street during the removal of the elevated structure. If the arterial is not built, a temporary road between Forest Hills and Call Street on the west side of the tracks may be considered.

## 6.2.9 Rail Service Loss and Replacement During Construction

### 6.2.9.1 South Station/Back Bay Shuttle

The Construction of the proposed project represents a major undertaking. Regardless of alternative, the construction along the Shore Line (mainline of the Penn Central Railroad) would involve major project elements adjacent to, over and below the existing right of way.

This massive transportation improvement project could be carried out while railroad services were maintained for the current commuter riders. It is estimated that maintaining the commuter rail service during construction would cost an additional $69.7 million dollars (including 30% engineering and contingincies) and an estimated 15 months of additional time.

In addition to the construction time and cost implications, patron inconvenience and delay would be necessitated by slower train operations due to construction operations and the close proximity of construction equipment. Under these conditions, an estimated 5650 rail riders would be inconvenienced over a 5 to 6 year period.

It is therefore proposed that service be temporarily replaced on other mass transportation rights of way and modes during the 4 year construction period.

Service from Stoughton, Providence and Franklin would be diverted at Readville to the Midland Division travelling then directly to South Station.

In addition, a shuttle between South Station and Back Bay would be provided as described in section 6.2.9.1 Needham Branch to South Station passengers would be offered substitute express bus service in new coaches. These measures would permit the estimate 3000 riders whose destination is South Station, a direct ride in the same or shorter travel time.

Needham Branch riders bound for Back Bay from Needham, West Roxbury, and Roslindale would be offered express bus in new coaches to Copley Square. Estimated travel times for the bus routings are defined in Sections 6.2.9.2 and 6.2.9.3.

Riders from West Roxbury and Roslindale bound for the downtown Shopping and Financial Districts could ride the existing bus and rapid transit system to downtown, or charter bus subscription service might be offered (see Section 6.2.9.5).

Riders utilizing Mt. Hope (about 5 to 10 patrons) and Hyde Park/ Cleary Square (about 90 to 115 patrons) stations would not be served during the construction period (see Section 6.2.9.4).

The projected ridership on each commuter branch as well as proposed substitute service during construction is presented below.

PROJECTED RIDERSHIP FOR SUBSTITUTE TRANSPORTATION SERVICE DURING SHORE LINE RECONSTRUCTION

| Destination | Service Origin | Stoughton 1 Providence Franklin | Needham 2 | West Roxbury 3 Roslindale |
|---|---|---|---|---|
| Back Bay | 1820 | 1100 | 320 | 350 |
| South Station | 3880 | 3000 | 480 | 400 |
| Total Riders | 5650 | 4100 | 1500 | |

1: see Section 6.2.9.1 and 6.2.9.4
2: see Section 6.2.9.2
3: see Section 6.2.9.2.

#### 6.2.9.2 South Station/Back Bay Shuttle

If rail service were to be diverted to the Midland Division during construction, alternative methods of transportation would be provided for commuter railroad riders bound for Back Bay Station. Approximately 1100 riders bound for Back Bay use the Stoughton, Providence and Franklin Branch which services all stations in the towns of Stoughton, Canton, Attleboro, Mansfield, Foxboro, Sharon, Norwood, Readville, Walpole, and Norfolk.

Patrons arriving at South Station via the Midland Division would be shuttled to Back Bay. Riders bound for South Station would suffer no delay over current service during diversion to the Midland Division. Provisions for riders on the Needham Branch are discussed in Section 6.2.9.2.

Three alternatives are described below and are discussed in depth in the Appendix D.

A. Shuttle Train Service Riders leaving Franklin, Stoughton and Providence commuter trains would walk across a platform, board a waiting Budd-car shuttle and alight at a temporary rail stop in the Back Bay area near the existing station. The shuttle would return to South Station with persons wishing to use the rail services at South Station.

Rail shuttles would meet every Franklin, Stoughton, and Providence train arriving in the AM peak period. Riders wishing to go to Back Bay would not have to wait very long for a shuttle. The rail shuttles could be scheduled to leave for Back Bay as soon as riders transferred from their train to the shuttle. There are two exceptions to this statement and they occur during the AM peak period. Two of the shuttles respectively meet two arriving trains. Riders wishing to go to Back Bay from the first train must wait five minutes for the shuttle's departure in each instance.

During the PM peak period, shuttle trains are scheduled to meet all but two of the Franklin, Stoughton, and Providence trains leaving South Station. In these two instances, riders using the shuttle service must wait at South Station six minutes for one train and ten minutes for another train. During the mid-day period, the majority of the arriving and departing commuter trains would be met by rail shuttles.

Trains scheduled before 7 AM or after 7 PM would not be met by rail shuttles in this alternative. Weekend trains would not be met. Demand for shuttle service at these times does not seem to justify the cost of providing shuttle service by rail. It is estimated that 1100 commuter rail patrons would be inconvenienced by ten minutes (in each direction) by the project if they used the service.

AMTRAK trains would not be served by rail shuttles in this alternative. Back Bay is a final destination for a small share of inter-regional and interstate rail users. The 250 users arriving by AMTRAK from the southwest could make transit connections to Back Bay via taxi or Red and Green Line transit.

The inconvenience would last for most of the four- to five-year duration of the Orange Line relocation.

Commuter rail and AMTRAK service via the Boston and Albany Railroad to Back Bay and South Station would be maintained during construction with minor delays (if any) at Back Bay during construction for the current four trains in each direction per day.

B. Bus Service Via the Massachusetts Turnpike

Bus service could be offered if a ramp were constructed to allow westbound buses on the Turnpike to return eastbound to South Station. The ramp would be located near Exeter Street and Huntington Avenue. The grade of the ramp would be undesirable because of constraints.

C. Bus Service via Local Streets

Alternative C differs from Alternative B in two respects. First, to serve Back Bay and South Station, buses operated in Alternative C use local streets instead of the Massachusetts Turnpike. Second, the service in Alternative C can include stops at locations along the bus route in addition to serving the immediate vicinity of Back Bay Station. No intermediate locations can be served in Alternative B.

Buses leaving South Station in Alternative C proceed to Back Bay via Atlantic Avenue, Kneeland, Stuart, Eliot, and Providence Streets, St. James Avenue, Clarendon, Buckingham, and Dartmouth Streets. The buses will return to South Station via Dartmouth, Stuart, and Kneeland Streets and Atlantic Avenue. (See Appendix D for details of schedule)

Travel Times

Fig. VI-2 compares the travel times associated with the three alternatives. Travel times associated with Alternatives A and B are the same. From the standpoint of travel time between South Station and Back Bay both alternatives are favorable to Alternative C.

(Fig. VI - 2)

TRAVEL TIMES SOUTH STATION/BACK BAY

| | To Back Bay From South Station | To South Station From Back Bay |
|---|---|---|
| Alternative A* (Proposed Alternative) | 6 minutes | 6 minutes |
| Alternative B | 6 minutes | 6 minutes |
| Alternative C | 16 minutes | 16 minutes |

Reliability and Convenience

Fig. VI-3 presents a ranking of alternatives several standpoints of reliability and convenience.

(Fig. VI-3)

RANKING OF SHUTTLE ALTERNATIVES FROM CONVENIENCE AND RELIABILITY STANDPOINTS

| | Alternatives A* | B | C |
|---|---|---|---|
| Schedule Adherence | 1 | 2 | 3 |
| Walk time between trains and shuttle | 1 | 2 | 2 |
| Waiting time between trains and shuttle | 2 | 1 | 1 |
| Convenience of Back Bay locations served | 3 | 2 | 1 |

* Alternative "A" (Railroad Shuttle) is the proposed service during construction.

1 = highest ranking (most favorable of the alternatives)

3 = lowest ranking (least favorable of the alternatives)

An alternative with a lower numerical ranking in a category is superior to an alternative with a higher ranking. In some instances, two alternatives have the same rank in a particular category. This means that neither alternative is superior to the other from this particular standpoint.

The first category is arrival on schedule. Alternative A operates on a rail right-of-way between the two stations which now contains six tracks. This Alternative provides for a maximum of two shuttle trains operating simultaneously. This is easily accomplished since most of the commuter rail service will be rerouted from the right-of-way. The travel times in Alternative A will not vary significantly. Of the services offered in the alternatives, rail service will have the best record for on-schedule arrivals. Bus service offered in Alternative C involves operation of buses entirely on local streets. Traffic congestion, construction, and parking violations are likely to contribute wide variations in travel time between South Station and Back Bay under Alternative C. Of the services offered, bus service in Alternative C will have the poorest record for on schedule arrivals.

The second category is length of walk at South Station necessary to transfer between the commuter trains and shuttle vehicles. Rail shuttle service is ranked superior to services involving buses. Riders of rerouted commuter trains could often transfer across a platform to reach shuttle trains. These riders must walk further to reach the buses.

The third category is the length of waiting time necessary to transfer between vehicles at South Station. During the peak hour, several shuttle buses meet each train. Only one shuttle train meets each train. Buses have a greater potential than trains for leaving and departing quickly. Alternatives involving buses are ranked as superior to rail-shuttle service.

The final category is the convenience of location on pick-up and drop-off points within Back Bay. Bus service on local streets has the potential for serving several locations along the route without affecting service. These locations served by Alternative C are closest to major employment sites, commercial sites and transfer points of all Back Bay locations served by the Alternative. The Back Bay location served in Alternative B is more convenient than the location served in Alternative A for most riders, but this is the case today at the existing Back Bay Station. The location served in Alternative B is closer than Back Bay Station to employment, shopping, and MBTA transfer sites.

The comparison of Alternatives in Fig. VI-3 does not show any of the Alternatives as equal to or more favorable than the others in all four categories listed. Some of the categories are more important to riders or operators, who must schedule vehicles and assign drivers shifts. It is also of importance to riders who must meet trains that are scheduled to leave South Station or who must arrive at work at a fixed time. Alternative C, while it has potential for serving the most convenient locations in Back Bay, offers the service that has the widest variations in travel times.

## Costs

The total of the operating and capital expenses of the alternatives are given in Fig. VI-4.

(Fig. VI - 4)

TOTAL COST IN 1975 DOLLARS
FOR SOUTH STATION TO BACK BAY
SHUTTLE ALTERNATIVES

| | A | B | C |
|---|---|---|---|
| Operating Expenses[1] | $921,000 | $681,000 | $852,000 |
| Capital Expenses | | | |
| Construction | 190,000 | 1,850,000 | - |
| Rolling Stock | 33,000 | 409,000 | 580,000 |
| TOTAL EXPENSES | $1,144,000 | $2,940,000 | $1,432,000 |

[1] Assumes a 4 percent discount rate. Operating expenses are the total expenses for providing service over a four year period (the expected duration of the construction phase of Orange Line Relocation)

6.2.9.3 Express Bus Service Needham to Boston

Express Service between Birds Hill, Needham Center, and Needham Heights and Boston.

If Needham Branch rail service were discontinued during construction, the approximately 800 - 900 commuter rail riders using stations in Boston could either use the frequent, existing feeder bus service to the existing Orange Line during construction or alternative service as described in section 6.2.9.3. No direct alternative public transportation service currently exists for the approximately 800 - 900 commuter rail riders using Needham stations. The express bus-service option was developed as an alternative service since it was comparable to commuter-rail service to Needham and could be used as a substitute service during the construction phase of the relocated Orange Line.

The bus service option offers express bus service via the Massachusetts Turnpike between Needham and Boston. All bus service in this package would operate in one direction only on a loop serving one stop each at Needham Heights, Needham Center, and Birds Hill station vicinities. Buses would operate on the loop via Highland Avenue, Great Plain Avenue, and Route. 128. Buses from Boston would enter Highland Avenue from Route 128, turn on Great Plain Avenue, and return to Route 128 at the Great Plain Avenue access ramp. Having served the loop, buses would then proceed to Boston via the Massachusetts Turnpike.

During the morning and evening peak hours, two Boston locations, Copley Square and South Station, would be served separately by express buses to and from Needham. Service frequencies between Needham and South Station would be greater than frequencies between Needham and Copley Square.

During the remainder of the day, two Boston locations would both be served by the same express buses to and from Needham. A bus from Needham would proceed first to Copley and, then, to South Station. The bus would return to Needham serving, first, South Station, then, Copley Square, and go on the Needham via the Massachusetts Turnpike.

## Service Frequency and Capacity

Any express bus service designed to be comparable to Needham's rail service must offer higher frequencies to the major downtown destination, because the capacity of a train serving the Needham Branch greatly exceeds the capacity of an express bus. Fig. VI-5 compares service frequencies (in terms of inbound departures), seated capacities, demand for the two alternatives and for currently offered rail service. Copley and South Station are served separately in the peak period and are on the same route during the remainder of the day. Daily departures and capacities shown for express bus alternatives are to either Copley or South Station. Thirty buses leave Needham daily. South Station is served by 27 of these buses, and Copley is served by 9 of these buses.

Both destinations are served by each departure by rail. Seated capacity for rail during the peak hour greatly exceeds Needham demand. The additional capacity for rail is necessary to accommodate riders boarding at stations outside of Needham. The alternative has the capacity to serve estimated demand. It offers more frequent service than current rail service in order to provide line capacity equal to the line capacity offered by rail.

## Travel Times

Fig. VI-6 compares travel times of the alternative with current rail service to Needham. Fig. VI-7 presents this data in the form of a mock schedule. With a few exceptions, scheduled travel times by rail are similar to travel times estimated for the two alternatives.

## Fares

At the present time, rail fares to Needham are as follows:

| Between South Station (or Copley) and - | One Way Fare |
|---|---|
| Birds Hill | $1.20 |
| Needham Junction | 1.25 |
| Needham Center | 1.30 |
| Needham Heights | 1.35 |

It is consistent with the MBTA Fare Review Task Force recommendations for changes in express fares for 1976 to assume that an express-bus service to Needham would have a minimum of $1.00 and possibly $1.25 one way fare.

At this time, changes in the fare structure are being studied by the MBTA. These changes are being made to achieve greater consistency between fares charged and transit service provided throughout the MBTA District. It is impossible to predict what discounts would be available to commuters using express bus or what commuter-rail fare structure will be in effect at the time assumed for implementation of express bus alternative.

(Fig. VI - 5)

SERVICE FREQUENCIES AND CAPACITIES INBOUND FROM NEEDHAM

| | Bus Alternative | | | Current Rail Service | | |
|---|---|---|---|---|---|---|
| | Departures | Seated Capacity | Demand | Departures | Seated Capacity | Demand-(4 Needham Stations |
| **Weekday** | | | | | | |
| Peak Hour (AM) | | | | | | |
| To South Station | 9 | 450 ] | 580 | | | |
| To Copley | 3 | 150 | | | | |
| To South Station | | | | 3 ] | 1350 ] | 660 |
| Peak Period (AM) | | | | | | |
| To South Station | 14 | 700 ] | 770 | | | |
| To Copley | 3 | 150 | | | | |
| To South Station | | | | 5 ] | 1710 ] | 780 |
| Daily | | | | | | |
| To South Station ] | 30 ] | 1500 ] | 800 | | | |
| To Copley | | | | | | |
| To South Station | | | | 12 ] | 2250 ] | 810 |
| **Weekend** | | | | | | |
| To South Station ] | 10 ] | 500 | | | | |
| To Copley | | | | | | |
| To South Station | | | | 7 ] | 630 | |

(Fig. VI - 6)

TRAVEL TIME COMPARISON-BUS VS. COMMUTER RAIL (MINUTES)

| | Bus Alternative | Commuter Rail | Bus Alternative | Commuter Rail |
|---|---|---|---|---|
| Time of Day | AM Peak | AM Peak | Midday | Midday |
| To: South Station | | | | |
| From Needham Heights | 41 | 42 | 43 | 40 |
| Needham Center | 37 | 39 | 39 | 36 |
| Needham Junction | | 36 | 35 | 31 |
| Birds Hill | 32 | 33 | | 28 |
| To: Copley | | | | |
| From Needham Heights | 41 | 38 | 32 | 36 |
| Needham Center | 37 | 35 | 28 | 32 |
| Needham Junction | | 32 | | 27 |
| Birds Hill | 32 | 29 | 24 | 24 |
| From: South Station | | | | |
| To Needham Heights | 27 | 36 | 34 | 36 |
| Needham Center | 30 | 33 | 38 | 33 |
| Needham Junction | | 30 | | 30 |
| Birds Hill | 36 | 27 | 42 | 27 |
| From: Copley | | | | |
| To Needham Heights | 23 | 31 | 20 | 32 |
| Needham Center | 27 | 28 | 24 | 29 |
| Needham Junction | | 25 | | 26 |
| Birds Hill | 32 | 22 | 28 | 23 |

(Fig. VI - 7)

MOCK SCHEDULE

| Alternative A | AM Peak: Bus to South Station | AM Peak: Bus to Copley | AM Peak: Commuter Rail | Midday: Bus | Midday: Rail | Midday Return: Bus | Midday Return: Rail |
|---|---|---|---|---|---|---|---|
| Needham Heights | 7:26 | 7:22 | 7:25 | 11:57 | 12:00 | 3:34 | 3:36 |
| Needham Center | 7:30 | 7:26 | 7:28 | 12:01 | 12:04 | 3:38 | 3:33 |
| Birds Hill | 7:35 | 7:31 | 7:34 | 12:05 | 12:12 | 3:42 | 3:27 |
| Copley | | 8:03 | 8:03 | 12:29 | 12:36 | 3:14 | 3:04 |
| South Station | 8:07 | | 8:07 | 12:40 | 12:40 | 3:00 | 3:00 |

Costs

Cost comparisons for all bus alternatives are tabulated in Section 6.2.9.5.

#### 6.2.9.4 Bus Service Boston to Roslindale/West Roxbury

Three transit service alternatives are presented for the approximately 500 using Roslindale, Bellevue, Highland and West Roxbury stations if the Needham Branch service were suspended during construction. The approximate 100 rider boarding commuter rail train at Forest Hills could instead use the Orange Line which can be located at its station immediately adjacent. Because of the high frequency of service offered to the Orange Line's current 36,000 riders, no additional services on the Orange Line is necessary under Alternative A below.

Alternative A: Provide additional capacity on the feeder bus route to Forest Hills Station. It is estimated that the operation of eleven additional buses in the morning and evening rush hours would provide enough extra seated capacity to accommodate the approximately 800 Boston users of the Needham Branch stations. This modest increase in the number of vehicles is the result of the high frequency of bus service already provided to the existing 2700 to 3000 peak-hour bus riders from West Roxbury and Roslindale.

Travel times to downtown Boston (South Station) by the Needham Branch and by feeder bus to the Orange Line are compared in Figure VI-8. Waiting time at the Forest Hills Station was estimated to be two minutes for the purpose of calculating the travel times.

More travel time is necessary to reach Boston via feeder bus than via commuter rail from the four station areas. A loss in transit use would typically be expected as a result of this increase in travel time. The loss is offset by an increase in the use of Route 37 due to improved service frequencies. Trains on the Needham Branch have a maximum of a 20-minute frequency during the peak hour. Buses on the Route 37 would have four-minute frequencies during the peak hour.

(Fig. VI - 8)

TRAVEL TIMES TO BOSTON

| Station Vicinity | Via Needham Branch | Via Feeder Bus and Orange Line |
|---|---|---|
| West Roxbury | 27 minutes | 34 minutes |
| Highland | 25 minutes | 32 minutes |
| Bellevue | 22 minutes | 29 minutes |
| Roslindale | 19 minutes | 24 minutes |

Alternative B: Provide express bus service to Back Bay and additional capacity on the feeder bus route to Forest Hills Station.

Under this Alternative, an express bus service from the West Roxbury/Roslindale area to Copley Square would be operated during the morning and evening peak periods. Travel times to Back Bay would be longer on the express bus than they are currently on the Needham Branch. It takes 21 minutes to reach Back Bay Station from Highland Station via rail. Express bus travel times would probably be between 36 and 43 minutes.

In addition to the express bus service, Alternative B provides for extra buses to serve Route 37 during the morning and evening peak hours. It is estimated that six round trips in each peak hour could accommodate the Needham Branch riders not wishing to go to Back Bay.

Alternative C: Provide express minibus service to Back Bay and additional capacity on the feeder bus route to Forest Hills Station.

Alternative C is similar to Alternative B. Both options offer express service and additional feeder service. The express service in Alternative C is distinguished from the service in Alternative B by three characteristics. First, minibuses would be used in Alternative C. Regular 46-seat buses would be used in Alternative B. Second, frequency for Alternative C would be greater than the frequency offered in Alternative B. The minibus has less capacity than a standard bus. Higher frequencies are necessary to serve the express bus route with minibuses. Third, the express bus route is essentially the same in both options. The minibus has a lower turning radius than the standard bus. This permits the minibus to use Pond Street and the Jamaicaway around Jamaica Pond instead of Parkman Drive and Perkins.

Under Alternative C, hours of operation and travel times are the same as in Alternative B. During the morning peak period, there are 13 departures to Boston under Alternative C. During the morning peak hour, nine of these departures are made. Similar service is offered during the evening peak period.

In addition to the express-bus service, Alternative C provides for extra buses to serve Route 37 during the morning and evening peak hours. It is estimated that six round trips in each peak hour could accommodate the Needham Branch riders not wishing to go to Back Bay.

Alternative D: It would be possible to provide charter or subscription bus service from specified locations in West Roxbury and Roslindale to specified locations in Boston. This service would be pre-paid and run on a fixed route to downtown. Such service could be coordinated with or by key employers. While this is desirable, it is impossible to predict demand for this service at this early date.

#### 6.2.9.5 Bus Service, Mount Hope and Cleary Square to Boston

A small number of riders at Cleary Square (90 to 115) and Mount Hope (5 to 10) now use these stations in going to downtown Boston. It is not practical to consider special transportation packages for these riders since existing bus service to the Orange Line at Forest Hills from both locations and the close proximity of Cleary Square to Readville would result in adequate substitute transportation at no additional cost to the rider or the MBTA.

#### 6.2.9.6 Comparison of Operating Expenses during Construction for Needham Branch Riders

TABLE I

Comparison of Annual Expenses and Revenue for Rail, Needham Express Bus, and Feeder Bus Service to Forest Hills

(All Numbers are Expressed in 1975 Dollars)

1) Needham Express Bus Fare of $1.00

| | Needham Express Bus | W. Roxbury Feeder Bus | Sum of Bus Services | Commuter Rail |
|---|---|---|---|---|
| Operating Expenses | $703,100 | $115,100 | $818,200 | $1,217,300 |
| Revenue | 442,000 | 161,200 | 603,200 | 592,000 |
| Expenses Minus Revenue | 261,100 | (46,100) | 215,000 | 625,300 |
| Capital Cost Amortized | 122,000 | 103,200 | 225,200 | 0 |
| Net Annual Expenses | 383,100 | 57,100 | 440,200 | 625,300 |

2) Needham Express Bus Fare of $1.25

| | Needham Express Bus | W. Roxbury Feeder Bus | Sum of Bus Services | Commuter Rail |
|---|---|---|---|---|
| Operating Expenses | $703,100 | $115,100 | $818,200 | $1,217,300 |
| Revenue | 552,500 | 161,200 | 713,700 | 592,000 |
| Expenses Minus Revenue | 150,600 | (46,100) | 104,500 | 625,300 |
| Capital Cost Amortized | 122,000 | 103,200 | 225,200 | 0 |
| Net Annual Expenses | 272,600 | 57,100 | 329,700 | 625,300 |

Parenthesis indicate that revenue exceeds operating expenses.

TABLE II

Comparison of Annual Expenses and Revenue for Rail,

Needham Express Bus, Feeder Bus Service to Forest Hills, and

West Roxbury/Roslindale Express Bus

(All Numbers are Expressed in 1975 Dollars)

1) Needham Express Bus Fare of $1.00

| | Needham Express Bus | W. Roxbury Bus (Feeder and Express) | Sum of Bus Service | Commuter Rail |
|---|---|---|---|---|
| Operating Expenses | $703,100 | $231,700 | $872,000 | $1,217,300 |
| Revenue | 442,000 | 156,000 | 598,000 | 592,000 |
| Express Minus Revenue | 261,100 | 75,700 | 274,000 | 625,300 |
| Capital Cost Amortized | 122,000 | 112,600 | 234,600 | 0 |
| Net Annual Expenses | 383,100 | 188,300 | 508,600 | 625,300 |

2) Needham Express Bus Fare of $1.25

| | Needham Express Bus | W. Roxbury Buses (Feeder and Express) | Sum of Bus Service | Commuter Rail |
|---|---|---|---|---|
| Operating Expenses | $703,100 | $231,700 | $872,000 | $1,217,300 |
| Revenue | 552,500 | 156,000 | 708,500 | 592,000 |
| Express Minus Revenue | 150,600 | 75,700 | 163,500 | 625,300 |
| Capital Cost Amortized | 122,000 | 112,600 | 234,600 | 0 |
| Net Annual Expenses | 272,600 | 188,300 | 398,100 | 625,300 |

Parenthesis indicate that revenue exceeds operating expenses.

## TABLE III

Comparison of Annual Expenses and Revenue for Rail, Needham Express Bus, Feeder Bus Service to Forest Hills, and West Roxbury/Roslindale Express Minibus

(All Numbers are Expressed in 1975 Dollars)

1) Needham Express Bus Fare of $1.00

| | Needham Express Bus | W. Roxbury Buses (Feeder & minibus) | Sum of Bus Service | Commuter Rail |
|---|---|---|---|---|
| Operating Expenses | $ 703,100 | $ 303,300 | $ 943,600 | $ 1,217,300 |
| Revenue | 442,000 | 158,600 | 600,000 | 592,000 |
| Express Minus Revenue | 261,100 | 144,700 | 343,000 | 625,300 |
| Capital Cost Amortized | 122,000 | 123,500 | 245,500 | 0 |
| Net Annual Expenses | 383,100 | 268,200 | 588,500 | 625,300 |

2) Needham Express Bus Fare of $1.25

| | Needham Express Bus | W. Roxbury Buses (Feeder & minibus) | Sum of Bus Service | Commuter Rail |
|---|---|---|---|---|
| Operating Expenses | $ 703,100 | $ 303,300 | $ 943,600 | $ 1,217,300 |
| Revenue | 552,500 | 158,600 | 711,100 | 592,000 |
| Express Minus Revenue | 150,600 | 144,700 | 232,500 | 625,300 |
| Capital Cost Amortized | 122,000 | 123,500 | 245,500 | 0 |
| Net Annual Expenses | 272,600 | 268,200 | 478,000 | 625,300 |

Parenthesis indicate that revenue exceeds operating expenses

## 6.3 Adverse Air Quality Impacts

All of the adverse air quality impacts of the project alternatives discussed in Section 5 are unavoidable for the traffic data base and street geometry analyzed. A reduction in the impacts will occur with time as emission controls are exercised.

Typical emissions from an idling diesel engine in a bus are 0.64 grams per minute of carbon monoxide, 0.32 grams per minute of hydrocarbons, and 1.03 grams per minute of nitrogen-oxide. These can be compared to similar emission rates from a light duty vehicle of 13.0, 0.63, and 1.11 grams per minute respectively. In all cases, the rate of emissions for a bus are exceed by those of an automobile. The exhaust of a diesel engine also creates a noticeable and unpleasant odor in the air.

Thus, the operation of an offline bus station at which the dwell time of vehicles is greater than that needed only to load or unload passengers will result in a localized air pollution problem only if a large number of buses are idling simultaneously. The impact of such a station can be minimized by observance of Massachusetts Air Pollution Control Regulations 11.1.2 which prohibits unnecessary idling of such vehicles for more than 5 minutes.

For this project stationary source of air pollution impacts are projected to be insignificant compared with the total fuel used in the area.

## 6.4 Adverse Water Resources Impacts

### 6.4.1 Flooding

Flooding within the general project area is unlikely because of the existing extensive storm drainage network in the Corridor.

Construction of the Embankment alternative would have little impact because the existing network would require only minor modification. Replacement facilities would provide for present or enlarged capacities to handle runoff. Flooding which presently occurs at local cross streets would be eliminated by improved cross street profiles.

The Depressed alternatives would have closed drainage systems with gravity flow lines to three pumping stations. The pumping stations would be designed to cope with a 100 year storm and would be located close to existing drains such as Stony Brook Conduit which would be capable of handling the discharge.

Pump stations would likely be of the triple wet well type - two main pumps and one reserve pump. Timing devices would alternate the operation of the pumps to maintain even wear. Two sources of commercial power would be provided for pump operation. In addition, a standby diesel-electric generator would be provided at each pumping station to insure positive pumping capability during a possible commercial power outage.

### 6.4.2 Siltation and Chemical Pollution

Techniques used during construction to minimize soil erosion and to prevent silt and other pollutants from entering local water courses include the following:

- Exposed erodible area is kept to a minimum. Only the area needed for immediate grading is cleared or scarified.
- Wood chip mulch on 2:1 slopes

- Adequate sedimentation basins are built prior to grading. All grading runoff is then channeled to enter these basins.

- Sedimentation basins would also be constructed to receive ground water that would be pumped during construction and dewatering operations. Suspended solids would be allowed to drop from suspension before such fluids were disposed of.

- Rechanging of ground water would take mace in accordance with State and City regulations.

- No discharge of pollutants (sanitary waste, crankcase oil, solvents, lubricants, etc.) into streams is allowed during or after construction.

However, it is possible that approximately 3 to 6 tons per acre per year of sediment will enter Stony Brook Conduit and other nearby drainage facilities. This amount is acceptable and it is comparable to prevailing erosion rates.

Chemical and petroleum products used in the construction will cause some temporary pollution. Again, by implementing proper controlling measures, such pollution will be kept within acceptable limits.

## 6.5. Noise Abatement Considerations and Techniques

This section describes noise abatement considerations and techniques to minimize impact.

Existing noise levels are described in Section 2.3.2.

Projected noise levels and impacts for all proposed alternatives are described in Section 5.2.

### 6.5.1. Berkeley Street to Back Bay Station

Two alternatives were considered in this segment:

- SC-1 (Proposed Alternative) would leave the railroad and rapid transit facility at existing grade.
- SC-2 would extend the rapid transit (only) in a tunnel from the South Cove Tunnel extension to Dartmouth Street.

Elimination of Orange Line trains by tunneling from the South Cove Tunnel Extension portal to Back Bay Station would have a negligible effect on lowering the average noise level, because of the presence of the Massachusetts Turnpike which is the dominant steady noise source here, and the presence of the very loudest noises caused by locomotives on the railroad right-of-way. Complete elimination of the rail noise without elimination of traffic noise does not solve the problem. For these reasons a suitable solution for protection of houses on the South End side of the rail right-of-way would be to baffle the Turnpike with a noise wall running from Berkeley Street to Clarendon Street and to baffle railroad noise by extending the railroad passenger platforms as noise attenuating devices.

For the alternative that extends the South Cove subway, (SC-2) the covers over the track will provide a noise reduction of approximately 15 decibels in the rail noise, and a 5 to 10 decibel reduction in the Turnpike noise. For the proposed alternative that would place the Orange Line at grade, (SC-1) the reduction in rail noise, compared to the baseline case without covers, would be approximately 10 decibels, and the reduction in Turnpike noise would be 10 to 15 decibels. In both cases the maximum noise reduction would be at ground level, and the minimum would be at the upper floors of the nearest houses. If the covers are built, noise levels in this neighborhood will become noticeably lower than at present.

Railroad and rapid transit noise levels will be lower than at high speed since all AMTRAK and commuter trains will stop at the platforms adjacent to this neighborhood, and when they are moving it will be at relatively low speeds. The major noise source will be the trains that are pulled by diesels and diesels at idle while stopped at the station. By the year 2000 it is expected that only 25 percent of the trains will be diesel locomotive hauled, and these diesels will be in compliance with the new EPA noise regulations for diesel locomotives*.

### 6.5.2. Back Bay Station to Massachusetts Avenue Station

The proposed solution to eliminate the noise impact in the South End is to lower the railroad right-of-way approximately four to five feet from its present grade, construct walls at the edges of the right-of-way, and to span the walls with a lightweight deck. In essence the right-of-way would be in a tunnel that is approximately half above ground and half underground. Viewed from street level, this structure would appear to be six to eight feet tall.

*Federal Register, January 14, 1976

This solution has a potential problem in that the structure might block the windows of several apartments adjacent to the right-of-way. Taking these apartments, blocking off the windows and converting these apartments to other use, such as storage space, would overcome the problem. Another possible solution to blocking off these windows would be to rebuild the windows at a higher position on the walls above the top of the deck.

The proposed solution is to eliminate sections of the deck adjacent to such windows. However, this would noticeably reduce the noise reduction effectiveness of the deck. The noise level at such a gap would be at least as high as without the walls and deck. To combat this, windows near the gaps would need to be soundproofed and extra sound absorbing material would have to be added inside the tunnel. This would lower outdoor noise levels overall and would protect individual rooms. As housing was rehabilitated, windows could be blocked and the deck made continuous.

Soundproofing in general would consist of installing commercially available doubled gazed windows. (This was done, for example, at U Mass Columbia Point which is directly under a flight path for Logan Airport).

The walls and deck solution would solve the airborne noise problem in the South End and St. Botolph areas. Inside this tunnel the sound level would be about 10 decibels higher than it is for train operation above ground in the open. This is due to the reverberant build up of the sound inside a confined space with hard walls. If the walls and deck have a sound transmission loss of 40 decibels, the sound level of a passing train would be less than that of a low speed automobile. A transmission loss of 40 decibels can be achieved with walls and deck made of four inch thick dense concrete. This would satisfy the Leq67dB criterion by more than 15 decibels, if the deck were complete and would provide an overall level below the criterion if it were not.

Ventilation shafts may be necessary at a few locations between Back Bay Station and Mass Avenue. These shafts should be acoustically treated or the sound radiated from them will be as loud as a passing train without the deck. Acoustically treated ventilation shafts are commonplace in newer transit systems such as BART and Washington METRO and therefore they do not present a design problem.

#### 6.5.2.1 Additional Solutions

The following discussion describes other possible solutions to eliminate noise impact in the South End that were explored as part of the environmental analysis.

One option that was considered was to keep the Orange Line in tunnel all the way from the South Cove Tunnel to past the Massachusetts Avenue Station. Because both AMTRAK and commuter rail would still be running at the surface, the average noise level would only decrease a few decibels, and the maximum noise levels would be the same. Therefore, from a noise reduction point of view the benefits are negligible unless further noise control techniques were also implemented for AMTRAK and commuter rail.

The first step for any solution without a tunnel would probably be an extensive program of wheel truing and periodic rail grinding. This would lower Orange Line noise levels by approximately 5 decibels. More

importantly, it would lower vibration levels in the adjacent houses. (Vibration levels will be discussed later in more detail). However, the average sound level for all trains would only be lowered by a few decibels, and the criterion would still be exceeded by more than ten decibels.

For locations at street level and in backyards an extra ten decibels of noise reduction could be obtained with walls approximately ten feet above track level at the edges of the right-of-way. Viewed from the street side, and recalling that the baseline condition calls for lowering the grade by two feet, these walls would appear to be approximately six feet high. The track side of the walls should be treated with sound absorbing material, or the reverberant build-up of sound energy between the walls will degrade their effectiveness. The remaining problem is that noise levels at the windows of the closest residences, where one can look out and see the rail, will still exceed the impact criterion by at least ten decibels.

In combination with walls at the edge of the right-of-way, the nearby residences could be soundproofed. This would entail double glazed windows and air conditioning.

Walls at the edge of the right-of-way would lower outdoor noise at ground level by 10 to 15 decibels, which meets the criterion. And soundproofing windows that look down on the tracks would reduce interior noise levels to the same extent as lowering outdoor levels to $L_{eq}$67dB and leaving the windows open.

One question that must be answered is: Which window should be treated? Because the proposed walls at the edge of the right-of-way will shield lower level windows, one solution might be to only treat those windows from which the wheels of passing trains are visibile. Then once the corridor becomes operational, further treatment could be provided based on actual noise measurements.

Because of concomittant on institutional and operational costs associated with this option, the proposed option was examined which would lower the railroad and the Orange Line below existing grade. In addition walls at both sides of the right-of-way would be provided as well as intermittent covers with the provision for full cover at a later date.

Several other possible noise control solutions for the South End were explored during the environmental analysis. For the most part these have been rejected for various reasons. A brief description of some of these is provided below.

A speed limit of approximately 25 mph was one possible solution. It would lower the average noise level by approximately five decibels. However, it is not consistent with the rapid service that AMTRAK and the MBTA would like to provide, and it has the drawback that it is not a permanent solution.

Two other possible solutions that were considered are rail barriers and wheel/rail barriers. Rail barriers would be short barriers (only a few inches higher than the rail) placed on both sides of each rail and faced with a sound absorbing material on the rail side. It is expected that such barriers would provide approximately five to ten decibels in noise reduction at track level*, although they may

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*"Wheel/Rail Noise and Vibration," U.S. Department of Transportation, Report. No. UMTA-MA-06-0025-75-11, May 1975.

not be as effective for reducing noise at locations that look down on top of the rail. The U.S. Department of Transportation has plans to test such barriers to determine their noise reduction potential, but even then they might have to be ruled out because of practical problems such as snow removal. These barriers can only be viewed as a research project; at this time they should not be considered a proposed solution.

Wheel/rail barriers would be three to four foot high barriers placed between each set of tracks, shaped somewhat like station platform sides and lined with sound absorbing material. Although these barriers would work from a noise reduction point of view, they have been eliminated as alternatives because an extra three to four feet would be required between each set of tracks and this would require a 15 to 20 foot taking at the edges of the right-of-way occupied by residential structures or local streets. Wheel/rail barriers might also present problems with snow removal and work crew safety.

### 6.5.3. Massachusetts Avenue to Forest Hills

South of Massachusetts Avenue there are three basic alternatives for the rail alignment on: the Embankment, the Depressed and the Modified Depressed alternatives. The region of noise impact for the alternatives is best described by the noise contours. They should be viewed to determine the extent of the impact at a specific location. In general terms and in open regions, the extent of the impact for the rail exluding the arterial road (that is, the distance to the $L_{eq}$67dB contours) is approximately 380 feet for the embankment and 80 feet for the full depression. For the Modified Depressed alternative the region of impact would be approximately 80 feet on the east side and 175 feet on the west side. In most cases for the embankment the contours do not extend out to the full distance but stop at the first row or houses or buildings.

If noise barriers are used on the embankment, the extent of impact will be closer to the extent of impact for the cut but, acoustic decks at two critical areas (at the Mission Hill and Bromley-Heath Housing Developments) cannot be installed in the embanked alternatives without further amplifying the visual barrier effect.

The embankment barriers should be as close to the outside tracks as possible and approximately six to seven feet high, which would increase the visible height of the embankment by that amount. They do not have to be so high that they block the view of train passengers. In the critical areas discussed below, the track side of the barriers should be treated with sound absorbing material.

If the embankment alternative is selected, it is recommended that noise barriers be built. There are some locations where buildings not sensitive to noise abut the right-of-way and the requirement for barriers could be relaxed here. However, for the greater portion of the alignment six to seven foot high barriers should be included in the design.

In general, noise control for the west side of Modified Depressed alternative, when that side has a lower wall, is complex. Some additional noise reduction will be achieved if a low solid concrete safety wall is used at the edge of the right-of-way instead of a wire fence. This wall could be an extension of the walls of the cut and grading adjusted to slope covering part of the wall. In noise sensitive areas the wall of the cut should be treated with sound absorbing material.

Even with the Modified or Full Depression or noise barriers on the embankment there amy still be some noise impact at the following locations: Northeastern University and Carter Playground, Mission Hill Housing, Bromley-Heath Housing and the Boston Gas/High School site unless specific measures are taken.

The measured peak hour $L_{eq}$ sound level at the Ell Center at Northeastern University was 74 dB. The expected design year noise levels here and at Carter Playground to the south of the tracks will be similar to present conditions.

For both Depressed alternatives the alignment will be in a shallow cut. This is one location where the walls of the cut should be extended approximately five feet above the adjacent ground level to provide additional noise reduction. For the Embankment alternative the alignment will be approximately at the present grade. Six to seven foot high noise barriers are strongly recommended here for the Embankment alternative. For all of the alternatives consideration should be given to treating the walls of the cut (or the inside of the barriers) with sound absorbing material at this location.

At Mission Hill the problem is similar to the South End -- high close-up buildings look down on the tracks from above. The measured peak hour $L_{eq}$ sound level here was also 74 dB, and without special treatment noise levels in the design year will be similar. Noise levels on the ground are not the main problem because the noise reduction afforded by either the cut or noise barrier walls on the embankment. The problem is reducing the noise at the apartments that look down on the tracks form high above. A deck over the tracks in this area is proposed in the Depressed and Modified Depressed alternatives. It would completely solve the noise problem. If the deck were not built or if it were not extended the whole length of the Mission Hill Housing complex, then the following solution would be required. The walls of the cut (or the inside of the noise barriers at the edge of the embankment) should be covered with sound absorbing material. A wall between the Orange Line tracks and the railroad tracks at the station is already required; therefore, the above solution would be an addition to that wall.

At Bromley-Heath, the problem is almost identical to the problem at Mission Hill, although not quite as many housing units are involved. Again a lightweight deck over the trains is the proposed solution; it would also completely solve the noise problem at this location. If the deck were not built the noise reduction technique described above for the Mission Hill complex would also have to be used at the Bromley-Heath location.

The Boston Gas site has been proposed for use as a High School. It has a similar problem in that it is also up close to the right-of-way and has windows that look down on the tracks. Since this building will be renovated before the proposed project becomes operational, noise control should be incorporated into the building itself. Noise sensitive rooms should not be placed on the track side of the building, and good soundproofing windows should be used. UMTA has no specific guidelines for playgrounds, but FHWA classifies playgrounds in the same land use category as residences. The design noise level for this category is $L_{eq}$67dB. To satisfy this design level at new playgrounds and the Johnson Playgrounds noise barriers on the embankment or extended sidewalls or slopes for the Depressed or Modified Depressed alternatives should be used. Again the extended walls should be at least five feet above the adjacent ground level. Current plans for the High School include air conditioning and a minimum number of windows (these with special design) on the side of the building facing the rail and arterial corridor.

The following table presents a summary of the number of people impacted by each of the proposed alternatives. The number of people listed in the table for the No-Build alternative include those now impacted by rail noise along the Penn-Central alignment and those now impacted by Orange Line noise between Dudley Station and Forest Hills.

Removing the Orange Line from Washington Street will not totally eliminate the noise impact because of traffic noise, but the noise impact will be substantially reduced. This assessment was performed by the "Fractional Impact Method" described earlier and in the Appendix on noise impacts.

Noise impact as measured in $L_{eq}$ values along the Penn Central alignment, even without special noise control techniques, would be approximately equal to the present. If noise levels for trains in the future are quieter, as predicted, than at present, the increase in the number of passages would be affected.

### 6.5.4. Arterial Street Impacts

The proposed arterial is not expected to increase noise levels over existing conditions. In Segment II where the arterial would replace the present Columbus Avenue, the arterial road noise will be approximately equal to the present Columbus Avenue road noise. In Segment III the dominant noise source is the rail noise. If an arterial is built here the combined noise of the arterial and rail operations will approximately equal present conditions, provided the rail alignment is in a full or Modified Depression, or if barriers are used on the embankment.

No special noise control devices are expected to be used for the arterial road. The primary reason is that the most common noise device, noise barrier walls, are not compatible with urban roads. Barriers would have to be at least ten feet high to work effectively; even then they could not be continuous at intersections, and thus their effectiveness would be greatly compromised. Furthemore, the projected impact is minimal. The impacted zone is at most 130 feet on either side of the road. This area is largely cleared. At present the FHWA has recognized that most noise control techniques are generally incompatible with non-limited access urban roads, and the new FHPM 773 does not even require exceptions to the design noise levels for such roads.

It should be mentioned that one very effective noise control technique, namely quieting the vehicles themselves, although effective, cannot be undertaken on a project-by-project basis. This type of an approach is however being undertaken by the Federal government on a national level. The U.S. Environmental Protection Agency has proposed regulations that will require a gradual reduction in the noise levels of new medium and heavy trucks in the next ten years. This should help reduce future noise levels even below the predicted levels.

## 6.6 Adverse Community Impacts

Community Impacts fall into several categories; visual, noise, communication between neighborhoods, provision of sites for development, pedestrian movement, and acquisition of households and businesses. All alternatives require land acquisition. See Fig. V-38 for the number of takings and Section 6.6.6 for procedures.

The following sections discuss the impacts of the alternatives on Jamaica Plain, Roxbury, and the South End insofar as they are adverse and briefly discuss the measures taken to reduce them.

### 6.6.1. Embankment Alternatives

- The embankment will become higher and wider with noise walls and catenary wires added. This will increase the barrier effect and perpetuate artificial community divisions. Underpasses should be as numerous as possible and they should be made as visually open and light as possible.

- Embankment sides are difficult to keep clean and free of litter. Where possible, terrain should be sloped gently to make the land useful and therefore more likely to be maintained. Alternatively, a retaining wall could be used to permit leveling the adjacent land. Where embankment slopes remain visible, large and durable landscape materials should be chosen. Cleaning and maintenance responsibilities should be clearly established.

- Embankment slopes and retaining walls cast shadows which can present security problems and traffic hazards, especially just after dawn and just before dusk. Walls should be light colored and artificial lighting should be provided at key locations with special extended operating hours.

- The embankment slopes reduce the utility of several of the open spaces, especially where level play areas are at a premium. Where possible, the alignment should be adjusted to preserve existing retaining walls. In certain critical areas, new retaining walls or cribbing could be used to avoid encroachment.

- The embankment slopes reduce the utility of some of the land to be developed. In some critical areas it may be justifiable to use retaining walls or cribbing where definite uses for the land are established.

- Noise pollution, air pollution, and visual impact of significant increases in numbers of moving trains will extend much farther into the community (see Fig. VI-9). Negative effects on existing real estate will remain as at present or even become worse because of more frequent train operations. The same negative effects will restrict new development and rehabilitation. Banks may compound the negative impact by becoming more reluctant to lend mortgage and home-improvement money. Special measures may be necessary to influence lending institutions to continue to support the neighborhood. Noise walls and 100 percent electrification would help to reduce the original physical impacts, but depression of the tracks would do more to reduce physical impacts.

- The embankment will prohibit any air-rights development and will sharply inhibit the construction of additional pedestrian or vehicular crossings in the future. Therefore, there should be as many crossings provided as possible--even in excess of current demonstrable needs. The loss of air-rights opportunities cannot be directly compensated.

FIG. VI-9

SUMMARY OF NOISE IMPACTS

EQUIVALENT NUMBER OF PEOPLE IMPACTED BY RAIL NOISE*

| | | | | |
|---|---|---|---|---|
| I | No Build** | | | 1270 |
| II | Build | | | |
| | A. | South Station to Mass. Avenue | | |
| | | 1. | New alignment at two feet below present grade without extra noise control | 420 |
| | | 2. | Walls at edge of right-of-way with solid deck | 0 |
| | | 3. | Walls at edge of right-of-way with intermittent deck and soundproofing of limited number of adjacent structures | 0 |
| | B. | Massachusetts Avenue to Forest Hills | | |
| | | 1. | Embankment without noise barriers | 750 |
| | | 2. | Embankment with wall noise barriers*** | 690 |
| | | 3. | Depressed or Modified Depressed Alternatives**** | 80 |

* These numbers were calculated by the Fractional Impact Method explained in the appendix on noise. They are for the rail noise only; total automobile and truck traffic noise impact is expected to remain relatively constant. In order to compute these numbers it was assumed that the average number of residents per unit was 3.5 in Roxbury and Jamaica Plain, and 2.5 in the South End.

** The value for the no build alternative includes not only the impact adjacent to the proposed alignment but also the rail impact adjacent to the present Orange Line from Dudley Station to Forest Hills. That section of the present Orange Line would be directly eliminated and not replaced if any of the build alternatives are implemented.

*** No acoustic deck is possible at Mission Hill and Bromley Heath in the embanked alternative.

**** Includes acoustic deck constructed at Mission Hill and Bromley Heath.

- The lack of incentive to development of nearby vacant land may result in much of this land remaining vacant for a long time. This carries with it the maintenance and policing problems which are already apparent in the Corridor. Some provision should be made to insure that this land be maintained and policed and not be allowed to become a blighting influence on the whole neighborhood.

- There is less retail space available at station locations, particularly in the Forest Hills station complex. This space can be created within the stations in all Depressed and Modified Depressed alternatives.

- Open space and landscaping will be visible to fewer people because of the visual obstruction of the embankment. This could be compensated for by increasing the amounts of landscape materials and by landscaping the embankment sides.

- Visual control of the bikeway and walkways will be reduced by the embankment. Therefore, these elements should be planned with special concern for visibility and security. Artificial lighting and increased police patrolling could offset this problem somewhat.

- Underpasses pose a security problem because there are always blind corners as a pedestrian passes through. Underpasses could be made wider, and corners could be rounded to make it harder for persons to hide from view.

- Street intersections and pedestrian crossings will be more dangerous because drivers and pedestrians will not have full peripheral vision before arriving at the intersections. Traffic controls and intersection designs should take this into account.

- Fencing is necessary to provide safety for train operations.

### 6.6.2. Depressed Alternatives

- The increase in the volume of rail traffic could cause adverse impacts in the categories of noise and vibration. These impacts would be mitigated by measures to reduce noise and vibration which are discussed elsewhere. The depression of the rails and sound-reducing decks adjacent to high-rise housing locations are additional impact mitigation factors and often eliminate even the current impacts (See Fig. VI-9).

- Some unsightly land uses will become more visible. Landscaping can be designed to mitigate this. Community pressure may eventually cause these land uses to screen themselves or to move away. Greenbelt construction can be designed to hide these uses.

- In the build-street alternative, the embankment will not be available to mask the environmental effects along one side of the street.

- Fencing is necessary to provide safety for train operations particularly at bridge overpasses.

### 6.6.3 Modified Depressed Alternatives

- The raising of grades on certain streets that cross the depressed rails will result in some visual discontinuity as one looks along the street. Traffic signalization, street lighting, and pedestrian crossings would be designed to compensate for these effects on sightlines at Green, Boylston, McBridge and Williams Streets.

- Raised cross streets and the raised arterial will have sloped land running up to them which could have some of the same maintenance problems as the embankment. Slopes should be kept as gentle as possible and landscaping should be carefully done to insure utility and proper maintenance.

- Retaining walls along certain raised streets may create accumulation points for litter and potentially hazardous zones. To the extent possible, land at the foot of these walls should be conveyed to private parties or public agencies who would have clear responsibility for controlling the area.

- The Modified-Depressed alternatives include some slopes down to a lower wall at the tracks instead of high vertical walls at several locations. These depressions will tend to accumulate litter. These slopes should be fenced in order to limit vehicle access into park areas.

- Fencing is necessary to provide safety for train operations particularly at bridge overpasses.

### 6.6.4. Build Street Alternatives

- The build-street alternatives will have environmental consequences described elsewhere in this report. Generally, there will be reductions of similar environmental effects on other neighborhood streets where traffic flows are reduced. A landscaped buffer strip has been provided to lower noise levels by setbacks.

- Traffic flow on the arterial will in itself be an obstacle to cross-corridor movement. Frequent stop lights with pedestrian cycles could mitigate this problem. North of Jackson Square the existing total street width would be reduced because Tremont Street is eliminated so cross corridor movement will be enhanced somewhat in that area.

- Traffic flow on the arterial presents safety hazards to neighborhood children. Careful landscaping and detailed design can reduce the likelihood of children inadvertently running into the street. Nothing will be built within the buffer strip between transit and street which would attract pedestrians. Pedestrians will cross the arterial only at bridge locations when there are traffic controls.

- With the street alternatives, about one-third of the open space is near the arterial and therefore not suited for uses such as playfields. It can, however, provide the right-of-way for bikeways and sidewalks which would otherwise impinge on the active-use areas. The balance of the open space should be developed somewhat more intensively than otherwise to insure provision of a comparable amount of playfield capacity.

- There is less land available for auto-oriented commercial in the build street alternatives. This is not necessarily bad since these are land uses of marginal quality from the community viewpoint. There are other ample opportunities around the city for such development.

- The arterial tends to increase traffic flows on cross streets. Traffic controls and intersection designs should take this into account. Parking restrictions may be helpful in reducing congestion on these cross streets.

- North-South traffic flow will be redistributed between Forest Hills and Ruggles Street. Traffic controls and pedestrian bridges should mitigate this problem to a degree but would concentrate traffic volumes on new streets and provide some relief to others. Coincidentally, the traffic volume could stimulate the retail activities in the area making available a wider variety of goods and services. In addition, traffic relief to Centre and South Streets would improve service on the Arborway Green Line.

No-Build Street Alternatives - Jamaica Plain

- There will be less exposure of land to traffic and therefore less retail market potential in the corridor. Commercial sites are limited in any case, even with the arterial.

- Retail and other commercial real estate will be harder to market because of lack of access and poor visibility. Special corridor wide marketing efforts could help this situation somewhat in the short term, and residential areas will benefit by less traffic.

- Open space will be more unsafe because of reduced visibility and difficulty of direct patrolling by police and passers-by from autos. Landscaping should be designed for easy visual surveillance from nearby houses and streets. There should be a through route for patrol cars. Artificial lighting should be provided.

- Traffic remaining on neighborhood streets will remain bad and probably get worse. Measures could be taken to improve traffic flow, especially on Washington Street where the elevated structure will be removed, and some deliberate removing of traffic might be possible if increases on other streets were tolerable.

- There will be traffic congestion around the stations. Careful design at or near the stations can reduce this impact. Some other street modifications may be needed nearby.

No-Build Street Alternatives - Roxbury

- These alternatives keep the existing street patterns, between Jackson Square and Ruggles Street. The land parcels resulting from the existing configurations are not conducive to improved land use in the area. The build-street alternatives produce land parcels which are more suited to modern development than those now existing in the corridor.

- The arterial must be constructed in the Modified Depressed Alternatives in Roxbury since Columbus Avenue is too low to allow access over the rapid transit/rail facility.

6.6.5. South End Transit/Rail Alternatives

The most significant adverse impact in the South End might be noise that will be generated by a higher volume of rail traffic than at present. Noise attenuation measures are discussed in other sections, and if implemented as proposed, will effectively reduce or eliminate such adverse impacts including those currently existing.

Land acquisition in the Back Bay Station area under Alternatives SC-1 and SC-2 will require relocation and demolition. The redevelopment of these parcels will aid in healing the scars of demolition. If open space is the chosen use for these parcels, the end walls of properties abutting the acquired parcels must be treated in an appropriate architectural manner and landscaping and fencing must be carefully accomplished.

## 6.6.6. Acquisition of Properties

Various residential, business, and vacant-land parcels are required under the different alternatives. These acquisitions are listed by alternatives described in Figure V-38. A Conceptual-Stage Relocation Plan is available from MBTA which describes adequate provisions for the relocation of the specific households and businesses potentially affected by the various alternatives.

A summary of the Uniform Relocation Act of 1970 and the Federal and State relocation requirements follows.

### Federal and State Requirements

Federal law (Uniform Relocation Act of 1970), state law (Chapter 79A Massachusetts General Laws), regulations of the Federal Highway Administration (PPM 81-1), and regulations of the Massachusetts Bureau of Relocation provide that any highway or transit project that will involve the relocation of families or individuals must assure the following:

> There will be available sufficient decent, safe, and sanitary homes for sale and rent, adequate to meet the needs of each family to be relocated and within their financial means. In determining whether sufficient suitable housing will be available for relocation, the following criteria are applied (required by federal or state regulation):
>
> - Replacement housing must be decent, safe, and sanitary, as defined by Article II, Massachusetts Sanitary Code.
> - The cost of replacement houses (gross housing costs--mortgage or rent plus heat & utilities) must be within the financial means of households to be relocated. As a minimum, gross housing costs per year are not to exceed 25 percent of gross annual income.
> - Housing meeting the above standards must be available in locations that are in the same general area (as a minimum, within the same community), accessible to the relocatee's place of employment, in a neighborhood that is equal to or better than the one in which he lives, comparable with regard to public and commercial facilities, etc., and adequate to accommodate any of his special needs.
> - Replacement dwellings must be at least comparable to dwellings to be acquired, with respect to number of rooms, area of living space, type of construction, age, and state of repair.
> - Each household must have, as a minimum, three suitable choices for relocation.
>
> These criteria are applied to the overall supply of housing anticipated to become available, and in later phases--prior to the right-of-way acquisition--estimates

of available housing suitable to the needs of relocatees would be developed "to the extent necessary to assure that a relocation plan can be expeditiously and fully implemented," and to satisfy all requirements of state law and regulations of the Massachusetts Bureau of Relocation. Under federal law, if sufficient suitable dwellings could not be anticipated to become available in existing housing, then new housing must be built as necessary to accomodate all relocatees.

A program of "relocation advisory services" is in effect, including a staff of qualified professionals, that will assist people in finding homes suitable to their needs.

Under state law, the Massachusetts Bureau of Relocation must qualify an agency to assist persons displaced in finding housing and to disburse payments. An adequately sized staff of professional relocation workers is required to be available at times and places convenient to relocatees. According to federal law, the following "relocation advisory services" must be provided: a) personal interview to determine precise needs, b) referral to appropriate sales or rental housing, c) assistance in applying for relocation payments and other service, and d) advice and counseling on an individual basis as needed.

Other assistance to eligible relocatees guaranteed by law includes priority for low-rent public housing units, priority for moderate income units, priority for rent supplement and leased housing programs, and loan guarantee for prior homeowner on replacement home.

Relocation payments authorized by law are to be promptly paid to all eligible persons. Benefits to eligible families and individuals include:

- Payment for the actual cost of moving, or an amount (up to $500) based on a predetermined schedule. Families may elect whichever moving payment best serves their needs.

- Payment to a homeowner (up to $15,000 over and above payment given for the fair market value of his home) to enable him to purchase and finance a home comparable to the one he lived in.

- Payments to a tenant (up to $4,000 over a 4-year period) toward his new rental, or toward a down payment if he chooses to purchase a home.

Simply stated, relocation programs express a relationship between the housing needs of displacees and the availability of housing to meet those needs. Relocation is most easily accomplished, and choice is afforded for replacement housing, when housing market activity matches relocation needs and when the additional demand created by displacement is small enough to be absorbed without severe consequences to the overall market or some

segment of the market. It follows, therefore, that the kind of housing desired by relocatees must be available in sufficient numbers to assure that relocation needs and preferences will be adequately provided for. Unfortunately, precise needs and preferences cannot be determined at this early stage, nor can the availability of suitable housing be estimated with strict accuracy. However, past experience has shown that most households seek homes comparable to what they owned or rented prior to relocation, and FHWA has adopted standards of "comparable replacement housing" that reflect, in part, such experience. This criterion, as well as additional Federal and state standards for relocation housing, has been applied to the extent possible in determining at this preliminary stage the probable availability of housing for potential relocatees. The following factors have been considered:

- Number and type of dwellings affected, tenure and size of households, age and other characteristics of affected residents.

- Location and approximate value of dwellings to be acquired.

- Neighborhood characteristics.

## 6.7 Adverse Visual Impacts

The criteria for the analysis of the visual impact of expanded transportation facilities in the Corridor respond to the continuity, character, and scale of existing districts along its length and, the measures which must be taken to maintain the integrity of such districts.

The present rail corridor and embankment is an unavoidable intrustion to the intimate scale and the desirable character of these residential districts. However, through the use of landscape and urban design devices, including tree planting, lighting and the development of linear open spaces and bike paths, the modified embankment could be made more attractive than the present one. The modified embankment would be 2 to 4 feet higher without noise barriers and 8 to 11 feet higher with noise barriers. This height would be hard to mask or otherwise avoid as a presence in the neighborhoods. Its additional height would place it about 26 to 30 feet higher than grade in many areas. This is equivalent to a continuous 3 1/2 story building often several thousand feet long. The current embankment is constantly covered with graffiti, and there is reason to believe that a new higher one would otherwise become a billboard for such unsightly acts of vandalism.

The increased height of the embankment would further reduce sight lines across the wall. Its so called "Chinese Wall" affect would be increased and small areas adjacent to it would further be encroached upon visually. The Albert Street Playground and the several houses which abut it would feel its bulk to an even greater extent.

In a depressed option, the problem is simplified in that the great bulk of the embankment is no longers a factor. The discontinuity that a large open depression presents must be addressed. Design implications in the depressed option include the opportunity to bridge and to deck. Such techniques not only increase development potential, but provide visual and functional linkages across the Corridor. Further, landscaping, open space treatment and careful attention to the detail and character of the side walls and safety barriers (particularly in the sensitive historic districts which abut the Corridor in the South End) will ameliorate the overall visual impact of the project.

The Modified Depressed Alternative would approximate the fully Depressed Alternative in its effect upon cross-corridor vision. It would present a primarily flat terrain when viewed from Roxbury between Ruggles Street and Jackson Square since adjacent grade to the east would be raised. From the west, the view from Northeastern University would be of a low wall unless the university parking area were regraded. This could be accomplished as apart of the proposed project.

From the Mission Hill Housing development, the Modified Depressed Alternative would appear as an 8-foot low wall with a recreation area above since the acoustic deck proposed would be landscaped.

From Terrace Street in Mission Hill to the Lamartine Street Extension, and Lamartine Street in Jamaica Plain between New Heath Street and Mozart Street, the Modified Depressed Alternative would be below grade and present a fully depressed appearance.

From the west, between Mozart Street and McBride Street, the grading of the transit facility would appear alternatively as a landscaped gradual slope or a variable height retaining wall (0 to 10 feet) due to regrading of local streets which must cross over the depressed rails. Most of the Modified Depressed Alternative would be virtually indistinguishable as being at higher grade because of the gradual landscaped treatment of the slopes.

From the east between Centre Street and Boylston Street, the transit facility or arterial (if built) would be behind existing buildings and graded with landscaping at a gradual angle. From the east between Boylston Street and

McBride Streets it would be visable either as a landscaped slope dropping to the rail facility or as gradual slope and low retaining walls running up to the arterial facility at a varying height from 0 to 12 feet above former grade. Visually the actual height would appear much less due to gradual regrading of slopes. This view would be blocked by existing industrial uses from Amory Street between a point about 200 feet south of Boylston to roughly Minton Street; at the American Cellophane and Boston Gas, and Kinney Vaccuum Companies. Of a total length of 5,500 feet only 2,150 feet would be visable at all between Boylston and McBride Streets because of large intervening structures that abut the tracks.

South of McBride Street slopes gradually rise to the transportation facilities on the west and industrial uses abut it on the east.

Comparing the expanded embankment with the depressed option and Modified Depressed options, it is evident that no specific design configurations will significantly mitigate the unusual impact of the former. The expanded embankment will remain essentially a physical and visual barrier between communities and even increase in width. Although a number of open and light connections are planned at street crossings and station points, the inevitable "tunnel like" nature of these passages will remain a problem.

## 6.8 Adverse Fiscal Impacts

The MBTA does not plan any change in the assessment formula because of this project.

Operating cost impacts are discussed in Section 4.

Increase in costs of operation for railroad shuttle and bus alternatives during construction are tabulated in Section 6.2.9.5. The net loss of these due to capital requirement in equipment or track work, would be eligible as project capital costs and subject to Federal reimbursement.

Some net saving in commuter rail operation costs on the Needham branch is anticipated by bus substitution (see Chapter 6.2.9.5, Table 1). Loss, if any, in patronage and revenue on other railroad branches during the construction period is impossible to estimate though substitute shuttle service to Back Bay from South Station should minimize this effect.


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## 7.0 RELATIONSHIP BETWEEN SHORT-TERM USES OF THE ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

Previous actions in the corridor affect the current assessment of short and long-term benefits and costs. These actions, based on earlier plans to construct the Southwest Expressway (1-95 South) in the taking of lands north of Forest Hills and the clearance of virtually all of the structures occupying the proposed right-of-way for the expressway. The takings have been accomplished; one principal long-term price has already been paid. However, analysis of the proposal for a Relocated Orange Line has exposed the fact that new long-term development can reverse many of the impacts which have already occurred, and which can open up possibilities for long-range benefits which were not possible with the original expressway plans. The concurrent development of the proposed Relocated Orange Line, its related access facilities, and an intensive land development program in the Corridor leads toward a final product which can produce a net benefit for the Corridor neighborhoods and the region.

Alternatives have been developed with long-term benefits in mind, as well as considerations of how they would address detrimental impacts already caused by previous actions in the Corridor. This approach focused principally on the clearance that has already occurred and the short-term impact of uncertainty and time delay before a final decision was made on the program for transportation improvements.

The analysis of the relocated Orange Line project has addressed the potential for both short and long-term costs and benefits (See Sections 5 and 6). Possible short-term effects and their relationship to the maintenance and enhancement of long term productivity are discussed in the following text. These include questions of land acquisition, construction phasing and traffic patterns, and the economic effects of construction investment. Issues concerned with the longer-term productivity of the project include transport benefit, land development, flexibility for future transit services, and environmental enhancement through regional paths and open space.

### 7.1 Land Acquisition

The major clearance which occurred in the Penn Central corridor north of Forest Hills has negatively affected both public and private renewal in the adjacent communities. Takings and demolition, coupled with delay and indecision, have contributed to a sense of a downgraded community. The reversal of this negative trend is clearly a community objective which must be implemented as part of the decisions regarding development in the Corridor. A clear public purpose is to make the Corridor environment into a public asset rather than a liability.

The proposed project offers the advantage of not requiring the further large scale, short-term impacts of land acquisition which would have been necessary in an expressway project. Parcels near Back Bay Station will be necessary for right-of-way modifications under the proposed alternatives for construction of the rail/transit facilities including the new station. Some presently vacant land in Roxbury is required for all alternatives for the construction of the Relocated Orange Line and the railroad. Additional parcels are required in the modified embankment and depressed alternatives for construction of the Relocated Orange Line, the railroad, and the Arterial Street in Jamaica Plain.

Under the Modified Depressed Alternative (Alt. FH-5), the Relocated Orange Line and the railroad tracks are placed high enough as to be not affected by the existing ground water. This arrangement, inturn, requires that the arterial street to the east from Ruggles Street to Forest Hills, and all the local streets in between crossing over the depressed tracks, be raised in order to obtain the required vertical clearance. The result is that streets such as Ruggles, Tremont, Heath (and Highland), Center, Mozart (Atherton), Boylston, Green, Williams and

McBride, would be raised approximately 12 feet, and private properties along these streets will be affected.

The private properties affected by the raised local streets in the Modified Depressed Alternative, approximately seventy in total, would for the most part be able to remain with modifications to their accessways and entries. Construction easements and/or damages would be necessary. Proper designs in landscaping and architecture would be employed to minimize adverse visual impact and to maintain neighborhood integrity in the area.

This project does not use all of the land already acquired or to be acquired for the rail/transit and arterial street facilities. It offers the opportunity to use excess acquired land for community development. This would provide the opportunity to off-set some previous damage to the community and to create long-term economic, physical and social benefits for the Southwest Corridor.

## 7.2 Economic Effects of Construction Investment

Figure VII-1 summarizes the benefits derived from investment in the construction of the Southwest Corridor project.

To assist in reading the economic chart, the following sequential development of numbers for the "Modified Depressed Rail/Transit, No Arterial Street South of Jackson Square - with minimum grade adjustment to all tracks" Alternative is presented as a sample exercise.

### Construction Jobs - Man Years

A construction project of this type generates an estimated 36 man years of labor per million dollars in construction expenditure.

Construction Expenditure = \$242.3 Million
Man Years of Labor = 36 per Million

\$242.3 Million x 36 = 8722.8 Say 8700 Man Years

### Construction Jobs - Average Annual Man Years

The average annual man years of labor is derived by dividing the total MAN YEARS by the estimated duration of construction as set forth in Fig. V-13.

Man Years = 8700
Construction Duration (Years) = 4

8700 Man Years ÷ 4 years = 2175 Say 2180 Aver. Annual Man Years

### Construction Impact
### Average Annual Payroll (\$Million)

The average annual payroll is a function of the average annual man years multiplied by an estimated annual wage of \$12,500.

Aver. Annual Man Years = 2180
Aver. Annual Wage = \$12,500

2180 x \$12,500 = \$27.2 Million Aver. Annual Payroll

Construction Impact
Multiplier Effect on Economy ($Million)

The multiplier effect on local and regional economy can conservatively be estimated to be 1.4 times the average annual payroll.

| | |
|---|---|
| Aver. Annual Payroll | = $27.2 Million |
| Multiplier | = 1.4 |
| 27.2 Million x 1.4 | = $38.1 Million |

FIG. VII-1

SHORT TERM ECONOMIC IMPACTS DUE TO CONSTRUCTION

| PROJECT ALTERNATIVE | Construction Cost ($ mill.) | CONSTRUCTION JOBS | | CONSTRUCTION IMPACT | |
|---|---|---|---|---|---|
| | | Man Years | Aver. Annual Man Years | Aver. Annual Payroll ($ mill.) | Mult. Effect on Economy ($ mill.) |
| • DEPRESSED RAIL/TRANSIT, NO ARTERIAL STREET | | | | | |
| - with minimum grade adjustments, all tracks | 361.7 | 13,000 | 3,470 | 43.4 | 60.8 |
| - with Orange Line in tunnel to Dartmouth Street | 384.3 | 13,800 | 3,680 | 46.0 | 64.4 |
| • DEPRESSED RAIL/TRANSIT, ARTERIAL STREET EAST | | | | | |
| - with minimum grade adjustments, all tracks | 371.2 | 13,400 | 3,570 | 44.6 | 62.4 |
| - with Orange Line in tunnel to Dartmouth Street | 393.8 | 14,200 | 3,790 | 47.4 | 66.4 |
| • RAIL/TRANSIT ON MODIFIED EMBANKMENT, NO ARTERIAL | | | | | |
| - with minimum grade adjustments for all tracks | 164.4 | 5,900 | 2,360 | 29.5 | 41.3 |
| - with Orange Line in tunnel to Dartmouth Street | 188.3 | 6,800 | 2,470 | 30.9 | 43.3 |
| • RAIL/TRANSIT ON MODIFIED EMBANKMENT, ARTERIAL CROSSING EAST TO WEST | | | | | |
| - with minimum grade adjustments, all tracks | 177.8 | 6,400 | 2,560 | 32.0 | 44.8 |
| - with Orange Line in tunnel to Dartmouth Street | 201.8 | 7,300 | 2,650 | 33.1 | 46.3 |
| • MODIFIED DEPRESSED RAIL/TRANSIT, NO ARTERIAL STREET SOUTH OF JACKSON SQUARE | | | | | |
| - with minimum grade adjustments, all tracks | 242,3 | 8,700 | 2,180 | 27.2 | 38.1 |
| - with Orange Line in tunnel to Dartmouth Street | 266.2 | 9,600 | 2,400 | 30.0 | 42.0 |
| • MODIFIED DEPRESSED RAIL/TRANSIT, ARTERIAL STREET EAST | | | | | |
| - with minimum grade adjustments, all tracks | 249.2 | 9,000 | 2,250 | 28.1 | 39.3 |
| - with Orange Line in tunnel to Dartmouth Street | 273.3 | 9,800 | 2,450 | 30.6 | 42.8 |

## 7.3 Transportation Service

Construction of the transit facility in the existing and improved railroad Mainline Corridor results in improved overall transit service to the Corridor, and to the regional transit network. The addition of South End and Roxbury services and ultimately the circumferential transit line will create a public network which will provide an even higher level of transportation service.

Construction of the Relocated Orange Line will take place in an existing transportation corridor, so that there will be no major impacts in the introduction of a transportation element in densely populated urban environment. The capital investment in the Relocated Orange Line will be somewhat greater if the Orange Line and railroad facilities are depressed. This investment will not produce proportional transport service improvements, but will allow for long-term future flexibility for both public transportation both rapid transit and railroad and for development with reduced environmental impact.

The purpose of this capital investment for both the short and long-term would be to eliminate the principal environmental degradation which would be caused by the air, noise, community division and visual impacts which would result from the retention of the embankment particularly under conditions of increased commuter rail and AMTRAK service. This investment is not one which can be deferred. If the line is to be depressed, the action must be taken in the initial construction period. Later removal of the embankment may not be possible due to the potential for disruption to existing service and the land use which may exist in the future. Further, it is imperative that this land development be undertaken as soon as possible.

## 7.4 Land Development Opportunities

The Southwest Corridor Staff and various local planning agencies have worked for several years with residents, business men, and neighborhood organizations to identify local land development needs and goals. Work has also been done with environmental groups and agencies in order to see how the Southwest Corridor might help fulfill regional open space needs. A principal goal of the project is the physical and economic development of Corridor neighborhoods.

Joint-development of transportation facilities with new housing, commercial, industrial, and open space facilities are an integral part of this work. Without transportation development that is coordinated and environmentally appropriate, new development will be seriously hampered and neighborhoods will not improve. With proper consideration, the transportation facilities will generate desirable development.

Some of the results of this work have been published in the following three reports:

1 - Southwest Draft Environmental Impact Statement, Preliminary Location Report and Program Package Evaluation Report; Boston Transportation Planning Review; September 1972.

2 - Southwest Development Report, Southwest Corridor Development Coordinator, Summer 1974.

3 - Land Development in the Southwest Corridor from the Southeast Expressway at Massachusetts Avenue to Jackson Square; Housing Innovations, Inc., September 1974.

Because of the very open and participatory nature of the planning process, land development plans have evolved gradually as neighborhood's goals and alternatives become more focused. Some of the plans are very firm and are already being implemented. Others are flexible and must contain contingencies in cases where development on the land in question requires the impetus of new transportation facilities in order to become feasible.

A basic factor in real estate development is that of certainty. Until transportation elements are clearly fixed with strong commitments for implementation and construction, development is retarded. This certainty would occur upon approval of the transportation project, and concrete development plans could then move further forward.

The goals and principles upon which the land development planning process is based can be identified, as can the specific opportunities that exist in the neighborhoods and in the Corridor as a whole.

### 7.4.1 Goals and Principles

1 - To improve the physical character of neighborhoods that have suffered from highway right-of-way acquisition. To prevent further deterioration of neighborhood stability.

2 - To encourage development and construction of a nature that will strengthen the economic base of the communities adjacent to the transportation improvements.

3 - To provide joint development of a nature that will strengthen and reinforce transit use.

4 - To encourage development of a nature that will generate jobs for residents of the communities adjacent to the transportation improvements.

5 - To be sure that public transportation improvements, including the Relocated Orange Line, railroad improvements, and local surface transportation are provided in such a manner as to promote and strengthen land development as well as existing uses.

6 - To promote continuous, cooperative planning among residents, agencies, business people, local government and interested private organizations. The aim of planning is to achieve a consensus on a plan and construction on the cleared land area not required for transportation purposes. This includes identifying needed public improvements on DPW land and their implementation. Among the needs are: improvements in public transportation, establishment of permanent open space and recreation areas, other public facility improvements, and housing, commercial and industrial facilities.

7 - To identify and implement acceptable temporary uses for Corridor land that is not developable within 5 years.

8 - To identify and use other possible sources of support - both public and private - for agreed-upon goals.

7.4.2 Land Development Plan

The development plan which is presented in this section was prepared with the objective of providing public and private land development opportunities which could produce the maximum benefit to adjacent neighborhoods. The alignments of the transportation elements which create development parcels have been selected with the objective of providing service and access to adjacent neighborhoods with the minimum possible adverse impact upon those neighborhoods. The plan has incorporated the suggestions which arose at public presentations of the alternate plans for alignments and land use whenever possible.

### 7.4.3. Development Parcels

#### 7.4.3.1 Development Parcels - Jamaica Plain

Land development in Jamaica Plain considers vacant land and DPW owned structures in the Corridor from the area of the existing pedestrian bridge near Walk Hill Street to Jackson Square. Clearance had been partially completed in this area at the time work was stopped on I-95. As a result, the pattern of cleared land is somewhat disjointed leaving a variety of conditions. Discussion of impacts of the six construction alternatives will, for the sake of clarity, be more general in Section 7.4.5., "Development Potential" which will quantify the proposed uses for each land parcel.

Forest Hills area south and west of station.

Parcels 1 through 12 (There is no "Fully Depressed" alternative in this segment)

Existing Land Use: The surrounding area is primarily residential with some small scale retail and manufacturing on major thoroughfares. Major nearby uses are the Arnold Arboretum to the west and the Forest Hills retail area to the northeast. Some of Parcels 1 through 12 are presently in use for MBTA purposes, and for small scale retail and residential purposes.

Existing Zoning: M-1, I-2, L-5, R-5, R-8

Topography: Flat along Washington Street, rising moderately to the east, west, and northwest. Stony Brook Conduit runs through this area and encloses the former stream which ran approximately where Washington Street is today. Existing railroad embankments are major topographic features.

Proposed Uses:

Parcel 1: Auto-oriented commercial.

Parcel 2: Lumberyard and existing houses should be returned to private ownership.

Parcel 3: Existing houses should be returned to private ownership.

Parcel 4: Two family house and open space.

Parcel 5: Commercial or manufacturing.

Parcel 6, 7, & 8

For Modified Depressed Alternatives: These could combine to create a sizable commercial opportunity. Otherwise, special access provisions could be made to allow houses on parcel 7 to remain. In this case parcels 6 and 8 would be sold to abutters for private use.

For Embanked Alternatives: Parcel 7 would not be acquired. Parcel 6 could be sold to an abutter for private use. Parcel 8 could revert to Davis Monument Company if there is still sufficient land area after Washington Street re-alignment. Otherwise, parcel 8 could be used for commercial purposes.

Parcel 9: Fill should be placed against steep slope to stop erosion. Some auto-oriented commercial could occur along new Washington Street frontage. Balance of land not needed for Orange Line and Green Line yards should be sold to abutting homeowners to expand rear yards; control existing erosion through fill and walls.

Parcel 10: Existing house at 8 Asticou Road to be sold for private residential use.

Parcel 11: Mixed retail, office and housing. Should be designed to smooth the transition from station complex to residential neighborhood.

Parcel 12: Open Space bikeway, regional pathway. Should remain open and public as part of open space linkage. It is suggested that some of the State Public Health Laboratory land could be used to complete the linkage to the Arnold Arboretum.

Impacts of Transportation Alternatives on Parcels

Parcel 1 is more easily developed with the Modified Depressed alternative since the rail elevation is below the grade of the site. Parcels 2 and 3 will not be materially affected by the rail elevation. Easier pedestrian crossing of the corridor would enhance these parcels as well as others in the area.

For the Modified Depressed alternatives Washington Street must be raised enough to meet the cross street to Hyde Park Avenue. This means that parcels 4, 6, 7, 8 and 9 must be filled sufficiently to meet the new street grade. For the Embankment alternative filling would not be required and parcel 7 and part of parcel 4 would not have to be taken.

The Modified Depressed alternative with its corresponding rise of Washington Street makes parcels 10, 11 and 12 more attractive for development because of less severe grades and a more attractive outlook to the east.

Long Range Impact of Transportation Alternatives

For the Modified Depressed alternatives it would be possible to merge parcels 1, 2, 3 and 4 plus air rights over the tracks to create a site for a reasonably sized

medium density market rate housing development which would make off-hours use of station parking and would benefit the local retail area. The station area and neighborhood in general would benefit from the increased 24 hour population and from the reduction in unoccupied areas during off-hours. A pedestrian passage could link this complex directly into the station area without crossing streets.

For the Modified Depressed alternatives it would be possible to merge parcels 6, 7, 8 and 9 plus air rights over the Needham Branch tracks and Green Line yards to create a site for a market rate housing development, or for recreational use. Open space to the southwest between the Needham tracks and South Street could give this development a very pleasant environment.

If further study shows such developments to be a desirable possibility, then it is recommended that the land parcels involved be leased for temporary uses until the future air rights project becomes feasible.

Forest Hills Station and area to immediate north and east

Parcels 13 through 18

Existing Land Use: Apart from existing transportation facilities the area is predominantly in retail use and uncontrolled land use for parking. Nearby uses are the Arnold Arboretum to the west, the Arborway MBTA yards to the northeast and Franklin Park and Forest Hills Cemetery farther to the east.

Existing Zoning: L-5

Topography: Essentially flat except for the existing grade changes to be accomplished within the proposed new station (see architectural drawings). The William J. Casey highway overpass (connecting Arborway and Morton Street) is a structure of much height and length that it should be regarded as a major topographical feature.

Proposed Uses: (There is no "Fully Depressed" alternative in this area)

Parcel 13: Modified Depressed alternatives: Local neighborhood and auto-oriented retail. Has frontage on a busy street and faces an established retail area.

Parcel 14: All alternatives: Convenience and impulse retail. Frontage on a pedestrian path between buses, parking garage, and trains.

Parcel 15: Modified Depressed alternatives: Plaza and open space surrounding station head house and forming part of linkage between Arboretum and Franklin Park.

Embanked alternatives: Plaza and open space. Part of area below tracks could

be enclosed for retail use, although this is less attractive because of railroad and transit bridge overhead.

Parcel 16: Mixed uses including retail, office, hotel, housing and commercial parking. With embanked alternative and no Orange Line extension to Needham, the parking demand and impact may be such that this site will have to be used for a publicly owned parking structure.

Parcels 17 and 18:

Open space and possible site for municipal uses. City DPW yard could be moved to parcel 18 under the viaduct, removing an eyesore from the entrance to Franklin Park and enhancing the open space linkage to the park from the Corridor.

Impacts of Transportation Alternatives on Parcels

Parcel 13 is not available with the station designs for the Embanked alternatives. With the Depressed alternatives parcel 14 becomes larger and gains frontage on the plaza, parcel 15.

Parcel 15 contains some retail space with the Embankment alternatives, however the parcel is less attractive for open space since it is lower and it must pass under the tracks.

Parcel 16X is relatively unaffected by the transportation alternatives unless a combination of circumstances forces the later taking of this parcel for parking purposes. In this case, most development potential would be lost.

Parcel 17 and 18 are reduced slightly in area for the "no-build Jamaica Plain arterial" alternatives.

Long Range Impact of Transportation Alternatives

With the Modified Depressed alternatives it may be possible to complete an auto-free pedestrian linkage from the Arboretum to Franklin Park and northward along the corridor. This is not possible in the Embanked alternatives because the increased bulk of that structure will block the grade separated pedestrian right-of-way.

Arborway to Hall Street

Parcels 19X through 26

Existing Land Use: These parcels are situated in an area whose uses have been predominantly manufacturing and transportation-related. Immediately adjacent are residential neighborhoods of medium density. Morton Street and the William J. Casey highway overpass lie to the south.

Existing Zoning: R-8 and M-1

Topography: Relatively low and flat with some higher undulations to the west of the existing rail embankment.

Proposed Uses:

Parcel 19X: This is the present site of the MBTA Arborway yards and headquarters office. A capital grant application has been submitted to substantially upgrade the bus storage and maintenance facilities.

The proposed Forest Hills Station complex anticipates a relocated Green Line terminus and anticipiates relocation of storage yards to the southwest paralleling the Needham Branch right of way. These changes should permit a proposed wider greenbelt strip along the south side of the site. In addition, it is suggested that the southwest corner of the site be made available in the future for commercial development. An area of approximately 20,000 square feet is suggested although this might increase depending on land availability and market condtions.

Parcel 20X: No Arterial: Combined with parcels 21X and 22 to form a parcel with an area of approximately 69,000 square feet. This could be developed for additional oil storage facilities (parcels 20X and 21X are presently owned by Jenney Oil) or it could be developed for commercial use.

Arterial: Could be combined with surplus land from parcel 19X to create a parcel of about 40,000 square feet. Proposed use is commercial or retail.

Parcel 21X: No Arterial: Combined with 20X.

Arterial: Location is highly visible and commercially marketable at bend in realigned Washington Street. Retail use is proposed if land is not needed for oil storage operations.

Parcel 22: No Arterial: Combined with 20X.

Arterial: This is a very high visibility corner. Proposed use is commercial or retail.

Parcel 23: No Arterial and Embanked with Arterial: Sell to abutters for industrial use.

Depressed or Modified Depressed, Arterial East: Very little land area remains, merge into greenbelt system.

Parcel 24: Possible relocation site for American Legion Hall to be moved from adjacent site. Could also be used for retail or commercial.

Parcel 25: Small parcel remaining after connection is made between St. Marks and Anson Streets. Proposed use is parking for Fordham Court apartments and one house lot for a new one to three family house.

Parcel 26: Housing and open space.

Impacts of Transportation Alternatives on Parcels

Depression or Modified Depression of the rail facilities will make these parcels more developable because of improved environment and removal of the embankment slopes. Open space would also be more attractive and usable.

Construction of the arterial street would consume some land area, however in the Depressed and Modified Depressed alternatives most of this would come out of parcel 23 which has poor access and is not likely to be developed in a way which would create large benefits. The arterial would divide the large parcel at the Washington Street/Morton Street corner.

Long Range Impact of Transportation Alternatives

With the Depressed and Modified Depressed Alternatives it would eventually be possible to build on air rights over the tracks. This could take the form of office or housing development at Forest Hills and housing between parcels 23 and 26.

Hall Street to Sumner Hill

Parcels 27X to 45

Existing Land Use: Predominantly industrial to the east of present rail embankment and predominantly residential to the west.

Existing Zoning: R-8, M-1, M-2

Topography: Fairly flat, rising somewhat towards Sumner Hill to the northwest.

Proposed Uses:

Parcel 27X: Housing. Grouped with parcels 29 and 30 and possibly 26.

Parcel 28: Embankment with no Arterial: Suitable for small open space uses.

All other alternatives: Very small - incorporate into greenbelt system.

Parcel 29: Housing.

Parcel 30: Sell two houses currently standing or could clear for new housing.

Parcel 31: Sell to abutter or sell to owner of adjacent lot.

Parcel 32: Housing. Site for a new one to three family house.

Parcel 33: Housing. Site for a new one family house.

Parcel 34: Housing-related. Sell to abutters for expanded backyards.

Parcel 35 & 36:

<u>No Arterial</u>: Open space or housing. Housing could be low to medium density detached or multi-family.

<u>Arterial</u>: Open space.

Parcel 37: <u>Depressed and Modified Depressed</u>: Potential future decked area. Housing or open space related to high school. With decking installed parcels 35 and 37 can be aggregated. If arterial is not built, parcels 35, 37 and 38 can be aggregated.

<u>Embankment</u>: Not feasible for development of any kind.

Parcel 38: Leftover strip adjacent to high school. Transfer to high school for open space. For Depressed and Modified Depressed, no Arterial only: With air rights construction, (parcel 37) parcels can be aggregated for housing or for a unified public open space.

Parcel 39: Sell to abutters: southern end to high school, northern end to cellophane factory.

Parcel 40X & 41X:

Site of new Southwest II Jamaica Plain High School. Much of the site area will be athletic fields and open space accessible to neighborhood.

Parcel 42: <u>No Arterial</u>: Should be offered to City for possible safety improvements of Call Street/Everett Street corner.

<u>Arterial</u>: Open space (merged with parcel 36), and expansion of lot area for houses on parcels 43X and 44.

Parcels 43X and 44:

Embanked, No Arterial: Continue in present configurations.

Depressed and Modified Depressed: Continue in present use after revising shapes of lots.

Embanked, Arterial West: Analyze noise impact. Treat structures acoustically or remove them and attach remaining land to parcel 45.

Parcel 45: Housing or open space. Standing house at 22 Everett Street could be sold. Balance of site could be housing if subsoil conditions permit construction. Alternative use is open space, possibly with a sitting area for the numerous elderly residents of the neighborhood.

Impacts of Transportation Alternatives on Parcels

Full Depressed and Modified Depressed alternatives are beneficial to the future high school on parcel 40X in that they help mask the visual and noise problem. They enhance the utility of parcels 35 through 39. The opportunity to add bridges or decking over the tracks at a later date greatly benefits the future flexibility of the high school.

The modified depressed alternatives are an improvement over present conditions in terms of noise and visual impact, however they are not quite as beneficial as fully depressed. McBride and Williams streets must be raised, creating a 3 to 5% slope in Williams and McBride streets in order to get up and over the rail facility. Since the arterial street must be raised also at these intersections its noise impact is potentially more severe on the high school though proper design of this new facility would eliminate the problem within the building. Streets will boarder the high school site on three sides with slopes toward the rail facility. A 5-foot covering of the rail right-of-way in this area would improve conditions dramatically.

The Embanked alternatives worsen the present conditions visually but streets would remain as is. If the arterial street were to be located on the west side of the embankment, its impact on the high school will be reduced, but its impact on the open spaces will be greater. The extra right-of-way width reduces the area and usable width of parcels 35, 36 and 45.

For the Modified Depressed alternatives, the raised cross streets and the related raising of Call Street will affect several properties and the neighborhood to a limited degree. It will not have the same sense of wide open connection with the high school's open space as with the fully depressed alternatives, but will dramatically improve visual access across the tracks with most of the trees and the rehabilitated high school structure almost entirely visible from the west (see Section 6.7 Adverse Visual Impacts). Landscaped slopes will gradually rise from existing grade to the new facility.

The Modified Depressed alternatives will greatly improve visual access over the No-Build transit and Embanked alternatives. The Modified alternatives also permit the provision of much longer auto-free bikeways and trails than in any other alternatives.

The Arterial alternatives will benefit the high school by providing better vehicular access, but will limit the view more than in the No-Build street alternative. Pedestrian access from Green Street Station will be more secure also in the Build-Arterial option.

Long Range Impacts of Transporation Alternatives on Parcels

The Modified Depressed and Fully Depressed Alternatives would permit significant aggregation of land parcels between McBride Street and the corner of Call Street and Everett Street. Parcel 45 could eventually be expanded through air rights development.

Green Street Station Area

Parcels 46 through 53

Existing Land Use: Largely vacant except for a contractor's office and an auto wrecking yard. Former uses were commercial and residential.

Existing Zoning: R-8, L-1, M-1

Topography: Flat east of present embankment. Hilly and slopes upward to the west of the embankment.

Proposed Uses:

Parcel 46: Retail and housing.

Parcel 47: (alternate 4 only) Retail and housing.

Parcel 48: Retail incorporated in station design.

Parcel 49X: Retail or commercial.

Parcel 50: (Modified Depressed with Arterial) Could be open space or retail with open space. Brings open space network to east side of tracks and arterial.

Parcel 51: Transfer to adjacent owner or use as open space.

Parcel 52: Open Space. Expands Johnson Playground.

Parcel 53: Open Space. Wide enough for some active uses with No Arterial and Modified Depressed or Fully Depressed Alternatives.

Impact of Transportation Alternatives on Parcels

Depressed alternatives permit visual linkage of parcels 52 and 53 greatly enhancing the sense of openness. Modified Depressed, No Arterial also will have this effect.

The Embankment alternatives reduce the usability and attractiveness of parcels 52 and 53 because of the slopes and the visual separation.

The Modified Depressed alternatives require Green Street to be raised about 12 feet from existing grade with new ground slopes up to it. This, in turn, affects several adjacent properties that would be regraded. Slopes require that new development be designed accordingly.

Long Range Impacts of Transportation Alternatives on Parcels

The Fully and Modified Depressed, No-Arterial alternatives would permit the eventual merger of parcels 52 and 53. This would permit expansion of usable open space or alternatively would permit air rights development, perhaps for housing.

Milton Street to Boylston Street

Parcels 54 through 58X

Existing Land Use: Vacant and open space formerly residential.

Existing Zoning: R-8, L-5, L-1, M-1

Topography: Flat except for embankment slopes

Proposed Uses:

Parcel 55: Arterial Alternatives: Oakdale Street is rebuilt creating a lot for a one to three family house.

No Arterial: Land merges into parcel 52 (open space)

Parcel 54 & 56:

Open space.

Parcel 57: Open space except under Modified Depressed Alternatives and Fully Depressed, No Arterial. In these cases, there is sufficient land area for small retail and residential development.

Parcel 75X: Could be joined with parcel 57 to complete connection to Amory Street.

Parcel 58X: Has no access. Should be incorporated into open space or sold to abutting houses on Amory Street.

Impacts of Transportation Alternatives on Parcels

The Depressed and Modified Depressed alternatives will greatly improve the usability and attractiveness of the open spaces. The apparent size of the open space will also be much greater.

The Embankment, Arterial west severely impacts parcel 56 and reduces its usefulness.

Modified Depressed, Arterial will create a visual barrier between parcels 54 and 56, reducing the sense of openness.

Long Range Impacts of Transportation Alternatives on Parcels

The Modified and Fully Depressed Alternatives would permit eventual decking and substantial expansion of available open space. Residential or commercial development might occur over the tracks near Boylston Street.

Boylston Station Area

Parcels 59 through 64

Existing Land Use: Vacant and open space. Formerly retail, residential and industrial.

Existing Zoning: L-1, M-1, M-2.

Topography: Relatively flat, rising gently to the west and east.

Proposed Uses:

Parcel 59: Retail incorporated in station design.

Parcel 60X: Retail and housing.

Parcel 61: Retail. Difficulty of developing this small parcel suggests that it be combined with adjacent parcels to achieve a more substantial new development, possibly encompassing the entire block.

Parcel 62X: Housing, institutional or commercial. All three uses are adjacent, permitting this range of choices.

Parcel 63: No Arterial: Open Space.

Arterial: Lamartine Street is closed in this area permitting merger with parcel 62X and consequent expansion of its housing, institutional or commercial development. An open space strip should be maintained to accomodate the open space linkage system.

Parcel 64: Fully Depressed Alternative: Will remain visible and should be maintained as open space. Stony Brook Conduit prevents construction.

Modified Depressed Alternatives: The raising of Boylston Street will require the grading of the parcel and will make it suitable for passive landscaped use.

Embanked Alternatives: Could be sold off to adjacent industries for minor expansion, outdoor storage or parking.

## Impacts of Transportation Alternatives on Parcels

The Fully Depressed and Modified Depressed alternatives will enhance the apparent size and usability of open spaces. Reduced environmental impacts would increase the development potential of parcels 60X, 61X and 62X.

The Arterial Street, Embanked Alternative will enhance the retail potential of parcels 60X and 61X.

The Depressed and Modified Depressed Arterial East will permit interruption of Lamartine Street traffic, thereby improving parcels 62X and 63. This would improve their usability for residential or institutional purposes.

The Modified Depressed Alternatives require the raising of Boylston and Atherton Streets. This will affect several properties in the area and requires accomodation in new development.

## Long Range Impacts of Transportation Alternatives on Parcels

The Modified and Fully Depressed Alternative would permit future decking or air rights development over the tracks to the north of Boylston Street Station. This would permit expansion of parcel 63 for open space or development potential. If the arterial is not built, parcels 63 and 64 and the future air rights area could combine to make a development parcel of substantial size.

## Atherton Street to Jackson Square

## Parcels 65 through 75X

Existing Land Use: Vacant, parking and auto dismantling yard. Formerly manufacturing and residential. Surrounding uses are largely residential with some retail and manufacturing.

Existing Zoning: M-1, M-2, M-4

Topography: Fairly flat, rising gently to the east and west of the embankment.

Proposed Uses:

Parcels 65, 66 & 67:

Depressed: Housing or commercial.

Modified Depressed and Embanked: Commercial

Parcel 68: No Arterial: Open space or housing related.

Arterial: Too small to develop. Merge into greenbelt.

Parcel 69: Open space, commercial or manufacturing. Should merge with parcel 71 if development is to occur. Could serve as open space and parking for Club Arbeiter.

Parcel 70X: Could be independently developed for commercial or manufacturing if arterial is not built, though the limited access will be a problem. Type of use should be coordinated with parcel 71 development. If an arterial is built, parcel 70X will be acquired and remainder merged into parcel 71.

Parcels 71 & 72:

Mixed use retail and commercial.

Parcels 73X & 74X:

Retail, housing, manufacturing. Uses should coordinate with type of development on Parcels 65, 66 and 67. Modified Depressed alternatives require taking and filling of parcel 74.

Parcel 75X: Manufacturing, public facilities, open space. This is the largest developable parcel in this part of the Corridor. Improved transit service will greatly enhance its development potential.

Impacts of Transportation Alternatives on Parcels

The Depressed alternatives permit housing development on parcels 65 through 67, whereas the Modifed Depressed Embankment alternatives limit development to commercial.

Arterial street construction reduces the usable areas of parcels 68, 69 and 71, however it requires the taking of parcel 70x, thereby restoring some of the lost area. Arterial street construction also involves a partial closing of Amory Street, thereby permitting parcel 72 to be joined with parcel 71.

Long Range Impacts of Transportation Alternatives on Parcels

Depressed and Modified Depressed rail facilities could eventually be decked over, thereby permitting parcels 65 through 74X to work together as a major development complex.

### 7.4.3.2 Development Parcels - Roxbury

Land development in Roxbury considers vacant land in the Corridor from the Carter Playground south to Jackson Square at Centre Street. This is the area that was subjected to the greatest amount of clearance for the Southwest Expressway and consequently contains a large amount of presently vacant land. It offers the greatest opportunity for new development.

There are six basic transportation alternatives being considered for this portion of the Corridor (see Fig. IV-19):

FH-1 Transit/rail in depression - no-build street

FH-2 Transit/rail in depression - build street

FH-3 Transit/rail on modified embankment - no-build street

FH-4 Transit/rail on modified embankment - build street

FH-5 Transit/rail in modified depression; build street to Jackson Square; build street south of Jackson Square.

FH-6 Transit/rail in modified depression; build street to Jackson Square; no-build street south of Jackson Square.

The discussion of impacts of these alternatives will, for the sake of clarity, be more general than Section 7.4.5, "Development Potential" which will quantify the proposed uses for each land parcel.

#### Carter Playground to Ruggles Street

#### Parcels 16, 17, and 18

Existing Land Use: These parcels are situated in an area which had predominantly manufacturing uses until the buildings were demolished for road construction. To the east is Roxse Housing, Lower Roxbury Community Corporation Housing, Whittier Street Housing, and Francis deSales School and Church. To the west is Northeastern University, and Mission Hill Housing.

Existing Zoning: M-2 and H-2 (Northeastern).

Topography: Fairly flat, some filled land.

Proposed Uses:
Parcel 16: open space, community facility
Parcel 17: uses ancillary means to transit/rail station
Parcel 18 and 18b: major development location situated at the station for the Relocated Orange Line and the commuter rail line, and the juncture of a proposed cross town transit line and the intersection of two proposed arterial streets. These parcels are seen as having multiple use. They would contain a mixture of the following uses: Public facility, housing, office, retail, hotel, and/or institutional.

#### Impacts of Transportation Alternatives on Parcels 16, 17 and 18

This location will have excellent transportation access and is adjacent to a large aggregation of new and existing multi-family housing and to Northeastern University. It is also the Corridor location which experienced the maximum amount of clearance for the Southwest Expressway. For these reasons, major development has naturally been proposed here (parcel 18).

Under the "build street" alternatives a single large parcel is possible with the option to create air-rights development connecting to Northeastern University. However, the parcel is substantially reduced in buildability under the embanked alternatives: if the necessary bus loop is constructed under the rails and platforms, any development must be held back from the rails because of the noise generated and the difficulty of constructing air-rights over the already elevated platforms. Moreover, if the bus loop were not built under the tracks, the loop will consume about one-half of the available parcel. In the fully depressed alternatives, a simple air-rights crossing is allowed: in the modified depressed alternatives the air-rights crossing occurs at one normal story height above grade when approached from the west and is at grade on the east. This small grade change can easily be accommodated in the new development.

Under the "no-build street" alternatives parcel 18 is divided longitudinally by existing Columbus Avenue into parcels 18 and 18b. Parcel 18 becomes significantly less developable due to the reduction in area, and the conditions stated above concerning the embanked or depressed alternatives also apply. Parcel 18b remains developable for retail use or housing; however, the critically important direct access to the transit/rail station is lost in this alternative. Both parcels are adversely affected by the loss of the land area that would be gained through the abandonment of the Columbus Avenue right-of-way.

Parcel 16 disappears under the "no-build street" alternatives.

Ruggles Street to Roxbury Crossing

Parcels 19 through 25

Existing Land Use: These parcels are situated in an area which had predominantly manufacturing uses until the buildings were demolished for previously proposed highway construction. To the east is the proposed Campus High School, and to the west, Mission Hill Extension Housing, and a strip of manufacturing establishments.

Existing Zoning: M-2 and H-1 (Mission Hill Extension).

Topography: Fairly flat, some filled land.

Proposed Uses:
Parcel 19: Addition of open space for Mission Hill Extension, regional trail and bikeway.
Parcel 20: Provision of open space for Mission Hill Extension, community facility, retail, housing.
Parcels 21 and 23: Open space, regional trail and bikeway.
Parcel 22: Provision of various facilities for the Campus High School and the Occupational Resource Center.
Parcel 25: Expansion of existing adjacent manufacturing uses or housing in the event that manufacturing does not continue to be a viable use in this area.

Impacts of Transportation Alternatives on Parcels 19 through 25

Under the transit/rail depressed alternatives open space is proposed to be provided on parcels 19 and 20 for Mission Hill Extension in conjunction with a proposed open-space deck over the transit/rail facility. Additionally, retail and/or housing, or a community facility is proposed for the northern (Ruggles Street) portion of parcel 20. The fully depressed alternatives allow a simple air-

rights deck at grade; the modified depressed alternatives allow an air-rights deck approximately 8 feet high which can be approached by regrading at Mission Hill Extension and is approximately at grade on the arterial street or east side. If the embanked alternatives are constructed, the provision of additional open space for this dense housing becomes impossible and the existing housing will be subject to increased noise and the adverse visual impact of the embankment and would probably not pass the current noise guidelines for federally assisted housing. Parcel 25 and adjacent vacant land are being proposed for housing as a future use if manufacturing ceases to be a viable use in that location. Under the embanked alternatives this proposed housing would be subject to noise and the adverse visual impact of the embankment. Future development potential of parcels contiguous to the transit/rail right-of-way in the form of "air-rights" construction over the rails would be severely limited under the embanked alternative. The life of many structures to the west of the alignment is judged to be significantly less than that of the proposed transportation facility. When these areas become ready for redevelopment in the future, the potential of the land parcels will be greatly diminished due to the presence of an embankment. This comment applies particularly to parcels 21 and 25. The fully depressed alternatives allow simple air-rights structures at grade: the modified depressed alternatives allow air-rights structures one story above grade on the west and would be approximately at grade on the arterial street or east side. Parcel 25 would require filling, grading and retaining walls to allow a structure approximately at grade; these adjustments could easily be made in any new development after construction of the modified depression.

The "no-build street" alternatives in this portion of the Corridor, which would leave Columbus Avenue and Tremont Street in their present alignments leaves a long narrow parcel (parcel 22) between the rights-of-way. This parcel is too narrow in the most part for successful development for other than open space. The land gained by the relocation of Columbus Avenue is proposed to be added to the Campus High School and Occupational Resource Center site for construction of school facilities. The "no-build street" alternative makes impossible the enlargement of the High School site on a unified site and also loses the area for development that would result from the abandonment of the Tremont Street right-of-way.

## Roxbury Crossing to Heath Street

### Parcels 24 through 32a

Existing Land Use: These parcels are situated in an area which had predominantly manufacturing uses until the buildings were demolished for road construction. To the east, on much higher land than the Corridor, is the residential neighborhood of Highland Park (Fort Hill). To the west of the existing railroad embankment is a manufacturing strip along Terrace Street, above which is situated the residential neighborhood of Parker Hill.

Existing Zoning: M-2, some H-1 (vacant land).

Topography: The Corridor lies in a valley between Fort Hill and Parker Hill. The difference in grade from Corridor level to the crown of both hills is approximately 130 feet. The change in grade on the west (or Parker Hill) side is abrupt. A 60-foot rise occurs in between Terrace Street and Parker Street; however, this change occurs outside the Corridor. The change in grade on the east (or Fort Hill) side is more gradual than on the west side. A 60-foot rise occurs between Columbus Avenue and Centre Street, with much of the change occurring within the Corridor width.

Proposed Uses:

East Side: Parcels 24, 26, 28, 30 and 32:
Institutional use - the Roxbury Community College is presently undergoing site planning; regional trail and bikeway.

West Site: Parcels 27 and 29:
open space
Parcels 27a and 27b:
Adjacent to existing manufacturing
Parcels 25 and 31:
Expansion of existing manufacturing use or housing in the event that manufacturing does not continue to be a viable use in this area.

Impacts of Transportation Alternatives
Parcels 24 through 32

The effect of constructing the embanked alternatives will be to consign the land to the west of the transit/rail alignment to remain deficient in several development aspects for the life of the project. The parcels between the tracks and Terrace Street are very narrow (as average depth of approximately 75 feet); and contain old buildings which are presently used for light manufacturing and private housing. The steep cliff between Parker Street and Terrace Street forms a barrier to enlargement of land area to the west. The vacancy rate in these structures has increased over the years and there is a question of the viability of manufacturing as a use in this area. Efforts are being made to encourage manufacturing firms to locate in these structures. However, even if manufacturing continues to be viable in this location, the existing buildings have a life which is substantially less than that of the proposed transportation facility. When this area is ready for redevelopment at some future time, the development potential of these parcels will remain diminished due to the deficiencies present today: parcels have insufficient depth and usable area, and are blocked visually and physically by the presence of the embankment. The depressed alternatives will allow future air-rights construction to improve the buildability of this land and will allow creation of dimensionally sufficient development parcels which would be impossible given the embanked alternatives. The fully depressed alternatives would allow simple air-rights structures at grade; the modified depressed alternatives allow an approximately at grade condition between Tremont Street and Cedar Street extension (parcel 27a); however, south of Cedar Street any air-rights structure would be one story above grade on the west (parcels 27b and 31). On the east it would be at grade. This would be reached through new development at grade adjacent to the air-rights portion.

Site planning for the Roxbury Community College contemplates using air-rights over the depressed transit/rail for future expansion. This future development could be accessible by means of pedestrian connections over Columbus Avenue.

The "no-build street" alternatives would decrease the land available on the east side for the proposed Roxbury Community College by one-half acre. Additionally, the parcels between the transit/rail alignment and existing Columbus Avenue are seen as being marginally developable due to their depth and the fact of being sandwiched between Columbus Avenue and the track alignment.

Jackson Square

Parcels 33 through 35

Existing Land Use: These parcels are situated in a former manufacturing area. To the west is the Bromley-Heath Housing. To the east are some existing manufacturing uses, the Boston Public Works Department Roxbury Yard, and Connolly Playground which serves the adjacent residential area.

Existing Zoning: M-1 and B-1

Topography: The Corridor land remains lower than adjacent land; however, the difference in grades is much less than in the previous section. Maximum change in grade is approximately 20 feet in 800 feet. The grade change on the east is gradual; the change on the west is abrupt in the vicinity of Lamartine Street where approximately one-half of the rise occurs.

Proposed Uses:

Parcel 33: Extension of the Bromley-Heath Playground combined with the proposed open space deck covering the rail depression; regional trail and bikeway.

Parcel 35: Additional open space, bikeway, and/or a community facility, and retail.

Parcel 34: And related land is proposed for a major residential/ retail development. The excellent accessibility of Jackson Square by transit and automobile, combined with the surrounding residential area, should make this a prime site.

Impacts of Transportation Alternatives on Parcels

The embanked alternatives at Jackson Square will not permit an open space deck to be constructed over the transit/rail to provide additional open space for this dense project and the existing housing will be subject to increased noise and the adverse visual impact of the embankment. The existing housing would not meet current noise guidelines for federally assisted housing. The fully depressed alternatives and the modified depressed alternatives allow the construction of an open space deck in similar configurations and elevations.

The "no-build street" alternative in both street segments 2 and 3, and the "no-build street" alternative for segment 3 which aligns "build" segment 2 into existing Columbus Avenue, both diminish the land area available for parcel 34 which is proposed as a prime site for retail and/or housing uses. The above alternatives also separate the land in parcel 35 which is presently the island in the middle of a rotary street system from the land available in parcel 34 and the underutilized land abutting parcel 34.

The "build street" segment 3 alternatives which meets Centre Street at a right angle provide the most buildable area for parcel 34.

### 7.4.3.3 Development Parcels - South End

Land development in the South End considers land in the Corridor from the South Cove tunnel portal near Arlington Street to Carter Playground near Northampton Street. No land is cleared at present for the transportation improvements, and one of the two Alternatives (SC-1) proposes clearance of parcels in seven locations, none of which contains a significantly large land area. This analysis will discuss development opportunities at Massachusetts Avenue Station, and at Back Bay Station as well as at the seven locations where takings occur under Alternative SC-1. The remainder of the Corridor lying within the South End will not be further discussed herein, for the following reasons: a) the MBTA or the MDPW do not own any land near the right-of-way which is proposed for non-transportation redevelopment, and b) any vacant land or vacant building adjacent to the right-of-way are subject to disposition by the Boston Redevelopment Authority under its Urban Renewal Plans.

Massachusetts Avenue Station

Existing Land Use: Residential, predominantly in four-story row-houses; ground floor commercial on Massachusetts Avenue; the Boston Arena and Northeastern University one block to the west; Symphony Hall and Horticultural Hall two blocks to the north. The block northwest of the station entrance is cleared vacant land.

Parcels 1 and 2: Residential (vacant).

Existing Zoning: B-2 (Massachusetts Avenue), H-1 (to the east), M-1 (to the west around Carter Playground) and H-3 Northeastern.

Topography: Flat, filled land, tracks in cut, Massachusetts Avenue grades up to bridge over tracks.

Proposed Uses: Minor retail space within Station; air-rights over tracks on one or both sides of Massachusetts Avenue combined with new development on adjacent vacant parcels. Retail, office, and residential.

Parcels 1 and 2: Retail, office, residential, open space.

Back Bay Station

Existing Land Use: Adjacent to Hancock Garage (2,000 cars), 4 story garage, and 8 story office building to the south. The Massachusetts Turnpike interchange is to the west across Dartmouth Street. Nearby uses are major office buildings to the north, such as John Hancock and Prudential, and residential structures of a smaller scale in the South End to the south.

Existing Zoning: B-8 and B-10, H-2

Topography: Flat filled land, tracks in cut, Dartmouth and Clarendon Streets grade up to bridge over tracks.

Proposed Uses: Retail space within station, office space in air-rights structure above station.

Impacts of Transportation Alternatives

Alternatives SC-1 and SC-2 are similar in their effects on development at Back Bay Station; however, the Tunnel Alternative (SC-2) to accommodate MBTA tracks would require different footing locations and design of supports for air-rights structures than the alternative having no tunnel (SC-1).

Clarendon Street to Berkeley Street

Parcels 3 through 7

Existing Land Use:
Parcel 3: Residential/Ground Floor Commercial
Parcels 4 and 5: Residential
Parcels 6 and 7: Commercial

Existing Zoning: B-4

Topography: Flat filled land, tracks and Massachusetts Turnpike in cut.

Proposed Uses:
Parcel 3: Residential retail, and/or open space.
Parcels 4 and 5: Open space and/or use by abuttors.
Parcel 6: Residential commercial, and/or open space
Parcel 7: Use by abuttor.

Impacts of Transportation Alternatives on Parcels 1 to 7

Alternative SC-1: Parcels 1 and 7 are created by demolition of existing structures.

Alternative SC-2: Parcels 1 through 2 are created by demolition of existing structures.

## 7.4.4 Parcel Descriptions

The following figures contain tabulations of areas and land uses for the development parcels indicated in the accompanying maps.

The areas are approximate and were measured from the maps; and therefore do not have surveyor's accuracy. The acreages shown for the parcels correspond to land that is inside the Corridor. Areas shown for "expansion" or "related parcel"(indicated by a suffixed "x") are for land that is outside the Corridor and, unless so specified, are privately owned (this land is shown within dotted lines on the maps).

The total area for development parcels consisting of land within the Corridor is approximately 85 acres. About 55 acres outside the Corridor are being considered for development, together with about 4.5 acres of proposed deck over the Orange Line and railroad right-of-way in the depressed alternatives.

Fig. VII-2 Parcel Descriptions-Jamaica Plain FH-1

| PARCEL NO. | DWG. NO. | AREA SQ. FT. | AREA ACRES | LAND USES | COMMENTS |
|---|---|---|---|---|---|
| 1 | IV-20 | 97500 | 2.24 | Auto-oriented commercial | Orange line yards to be closed. Orange Line shop could be re-used |
| 2 | IV-20 | 51415 | 1.18 | Commercial and Housing | Continuation of present uses; return to private ownership. |
| 3 & 4 | IV-20 | 24889 | .57 | Housing and open space | Parcel 3 DPW owned, parcel 4 is not. Houses could be lifted to new street grade and fill added to site. Triangular end of parcel 4 should be left as open space. Vacant lots in parcel 3 should be filled to street grade and sold to abutters. |
| 5 | IV-20 | 54726 | 1.25 | Commercial or manufacturing | About 15,000 sq. feet of Stony Brook right of way adjacent along rear of lot could be used for non-structural purposes. |
| 6,7 & 8 | IV-20 | 38025 | .87 | Commercial or manufacturing | About 23,000 sq. feet of Stony Brook right of way adjacent along rear of lots could be used for non-structural purposes. Land will have to be filled to new street grade. |
| 9 | IV-20 | 99,000 | 2.27 | Green line yards and sale to residential abutters | A strip of land behind houses on Asticou Road should be filled to stop erosion. Land not needed for transit yards could be sold to abutters to expand their house lots. |
| 10 | IV-20 | 2780 | .06 | Housing | 8 Asticou Road-- a 2 family house -- to be sold for rehabilitation and occupancy after street construction. |
| 11 | IV-20 | 25700 | .59 | Mixed retail, housing and professional offices | Parcel makes transition between residential and station areas. |
| 12 | IV-20 | 40500 | .93 | Open space | Gateway to Arboretum. |
| 13 | IV-95 | FOREST HILLS STATION LOWER LEVEL | | | Approximately 50,000 square feet of retail catering to station users, local residents, and passing auto traffic. Some short term parking provided (see architectural drawings). |
| 14 | IV-95 | FOREST HILLS STATION UPPER LEVEL | | | Approximately 18,000 square feet of retail facing pedestrian path between bus and rail terminals, short term parking at kiss and ride zone. |
| 15 | IV-20 | 60,000 | 1.38 | Open space and plaza | Could be used for temporary outdoor shows, exhibitions, markets, etc. |

# PARCEL DESCRIPTIONS
# JAMAICA PLAIN
# FIGURE VII-2 TO VII-7

Fig. VII-2 Parcel Descriptions-Jamaica Plain FH-1 (Continued)

| PARCEL NO. | DWG. NO. | AREA SQ. FT. | AREA ACRES | LAND USES | COMMENTS |
|---|---|---|---|---|---|
| 16X | IV-20 | 111,900 | 2.57 | Retail, office, motel, housing or parking garage. Could be a mixed use complex. | Privately owned. Developer might purchase additional properties on Hyde Park Avenue to expand area and gain frontage. Connection to station via pedestrian bridge is possible. |
| 17 | IV-20 | 20,000 | .46 | Open space | Relocate commercial parking to station deck. Landscaping should be low to maintain sight lines for traffic. |
| 18 | IV-20 | 40,000 | .92 | Open space or institutional | Relocate commerical parking to station deck. Reserve site for future municipal uses. |
| 19X | IV-21 | 740,000 | 16.99 | MBTA garage and commercial | Some land (up to 20,000 feet) at southwest corner could be developed for commercial use. Green space strip should be reserved from Washington to Franklin Park along Morton Street. |
| 20X & 21X | IV-21 | 43700 | 1.00 | Commercial | Land is presently vacant. Jenney Oil (the present owner) could develop this for more tank facilities or for commercial uses. |
| 22 | IV-21 | 25600 | .59 | Commercial | This parcel could be sold to Jenney Oil for more tank facilities or it could be combined with 20X and 21X to make a development parcel with an area of 69,300 feet. |
| 23 | IV-21 | 111,000 | 2.55 | Industrial | Very poor access means only possible disposition is sale to abutters (mainly industrial) |
| 24 | IV-21 | 12,600 | .29 | Institutional | Possible site for relocation of American Legion Hall. |
| 25 | IV-21 | 18624 | .43 | Housing | Southern portion to be used for parking, nothern portion could be a house lot for a one or two family dwelling. |
| 26 | IV-21 | 155,000 | 3.56 | Housing and/or open space | Housing development could place clusters of units at ends of dead end streets with passages through to open space. Open space could be landscaped to give each street its own distinctive area. Parking should be provided at each cul de sac. Nearest the rail right of way is the beginning of the linear open space linkage (See Sheet A-14 Chapter 7) which contains pedestrian walk and bikeway. A distinct landscape feature could define the boundary between this public open space and the street-related semi-public open spaces. |
| 27X | IV-21 | 29415 | .68 | Housing | Could be assembled with parcels 29 and 30 to create a development area of 68,287 feet. |
| 29 | IV-21 | 23051 | .53 | Housing | Could be grouped with parcels 27X and 30 |

Fig. VII-2 Parcel Descriptions-Jamaica Plain FH-1 (Continued)

| PARCEL NO. | DWG. NO. | AREA SQ. FT. | AREA ACRES | LAND USES | COMMENTS |
|---|---|---|---|---|---|
| 30 | IV-21 | 15821 | .36 | Housing | Could be grouped with parcels 27X and 29. Standing houses to be rehabilitated or demolished. |
| 31 | IV-21 | 3387 | .08 | Housing | Too small to develop, sell to an abutter. Could be joined with a privately owned vacant lot to the south to create a house lot for a one to three family house. |
| 32 | IV-21 | 8386 | .19 | Housing | Could be developed with a one to three family house. |
| 33 | IV-21 | 4098 | .09 | Housing | Vacant lot between 32 and 33 could be purchased to expand house lot. |
| 34 | IV-21 | 19760 | .45 | Housing related | Parcel is shallow making development difficult. Sell to abutters on Newbern Street to expand yards. |
| 35 | IV-21 | 48500 | 1.11 | Open space and/or institutional | After allowing for walk and bikeway, useable width is about seventy feet. Possible location for community facility. |
| 36 | IV-21 | 49,000 | 1,12 | Open space and/or institutional | Useable width is about sixty feet. Possible location for community facility. |
| 37 | IV-21 | 41500 | .95 | Open space or housing | Deck over tracks is not to be built at this time. Combination of parcels 35, 37 and 38 gives an area of about 140,000 feet |
| 38 | IV-21 | 50,000 | 1.15 | Open space | Transfer to High School use. Useable width is about 85 feet. |
| 39a & 39b | IV-21 | 74,000 | 1,70 | Open space | Transfer to High School use. Useable width about 85 feet. Probably will provide the major pedestrian route between High School and Green Street station. |
| 40X | IV-21 | 216700 | 4.97 | Institutional | Site of new Southwest II district High School. |
| 41X | IV-21 | 247400 | 5.68 | Institutional | Athletic fields for High School. |
| 42 | IV-22 | | | | Unsuitable for rehabilitation, transfer land parcel to 36 or 43X. |
| 43X | IV-22 | 3300 | .08 | Housing | Part of back yards and one garage structure will be taken for transit purposes. If possible, some adjacent land should be made available to offset the reduction. Parts of parcels 42 and 44 could be transferred. |

Fig. VII-2 Parcel Descriptions-Jamaica Plain FH-1 (Continued)

| PARCEL NO. | DWG. NO. | AREA SQ. FT. | AREA ACRES | LAND USES | COMMENTS |
|---|---|---|---|---|---|
| 44 | IV-22 | | | Housing | Area included in parcel 45. Structure to be sold for residential rehabilitation. Bishop Street can be closed and some of the land used to enlarge the rear and side yards. |
| 45 | IV-22 | 44,000 | 1.01 | Housing or open space | Large frame dwelling to be sold off separately with about 10,000 feet of land. Parcel was apparently quarried or excavated at one time, then filled. Subsoil conditions may prevent development except as open space |
| 46 | IV-22 | 6000 | .14 | Retail or housing | Close to Green Street Station. Could combine retail with housing above. |
| 48T | IV-22 | GREEN STREET STATION | | | Approximately 2400 square feet of small scale convenience retail incorporated in station design. |
| 49X | IV-22 | 27,800 | .64 | Retail or commercial | Building at south end of site could remain. |
| 52 | IV-22 | 97,000 | 2.23 | Open space | Connects Johnson Playground to open space network |
| 53 | IV-22 | 110,000 | 2.53 | Open space or manufacturing | Ninety foot width could accommodate some active open space uses. Noise environment limits development opportunities to manufacturing. |
| 54 | IV-22 | 83,000 | 1.91 | Open space or manufacturing | 100 foot width could accommodate some active open space uses. Noise environment limits development opportunities to manufacturing. |
| 55 | IV-22 | | | Open space | Merges into parcel 52 |
| 56 | IV-23 | 151,000 | 3.47 | Open space | 130 foot width compares with about 175 width at present. Suitable for medium scale playfields. |
| 57 | IV-23 | 51,000 | 1.17 | Open space or retail | If parcel 54 is open space, then parcel 57 should also be open space with a walkway from the vicinity of the Neighborhood House to Boylston Street Station. Alternative development is retail near station. |
| 58X | IV-23 | 12480 | .29 | Open space or housing - related | Could be incorporated in open space system or could be sold to abutters to expand yards. |
| 59 | IV-23 | BOYLSTON STREET STATION | | | Approximately 2,400 sq. feet of small scale convenience retail incorporated in station design. |
| 60X | IV-23 | 21697 | .50 | Retail or housing | Could combine retail and housing |
| 61X | IV-23 | 4550 | .10 | Retail | Small size limits development to single story retail. Eventually this entire block might be assembled for a more coordinated mixed-use development. |

Fig. VII-2 Parcel Descriptions-Jamaica Plain FH-1 (Continued)

| PARCEL NO. | DWG. NO. | AREA SQ. FT. | AREA ACRES | LAND USES | COMMENTS |
|---|---|---|---|---|---|
| 62X | IV-23 | 30879 | .71 | Housing, institutional or commercial | Suitable for apartment,, elderly housing, nursing home or commercial. |
| 63 | IV-23 | 54600 | 1.25 | Open space | Ninety foot width permits small to medium scale active open space uses. |
| 64 | IV-23 | 55000 | 1.26 | Open space | Maintain as open space. Stony Brook conduit prohibits construction. |
| 65 | IV-23 | 14202 | .33 | Housing or commercial | Should have same treatment as parcel 66. Potential early development site. |
| 66 | IV-23 | 48117 | 1.10 | Housing or commercial | Parking could occur on parcel 67 to permit better quality development here. Potential early development site. |
| 67 | IV-23 | 92600 | 2.13 | Housing or commercial | Without decking over tracks the noise environment and shallowness of the site limit development to very minor commercial (auto parts & repairs, small warehouses and distributors, etc.) Housing could not occur until decking over tracks is feasible. |
| 68 | IV-23 | 60,500 | 1.39 | Open space or housing | Open space linkage moves entirely to East side of tracks here to take advantage of open space around 125 Amory elderly housing. When decking over tracks is feasible, parcels 65 through 74X plus the deck area could be combined to make a mixed use development parcel of approximately 13.8 acres. |
| 69 | IV-23 | 55500 | 1.27 | Open space, commercial, or manufacturing | Poor vehicular access discourages development. Combine with parcels 70X and 71. |
| 70X | IV-24 | 38130 | .88 | Commercial or manufacturing | Could be developed for a higher grade of commercial use or could be combined with parcel 71 for a mixed use development. |
| 71 | IV-24 | 100,500 | 2.31 | Mixed retail and commercial | Development must allow for pedestrian walk and bikeway to connect from parcel 68 past parcel 69 and through to an appropriate point on Centre Street. |
| 72 | IV-24 | 30931 | .71 | Same as parcel 71 | Should be developed in conjunction with parcel 71. |
| 73X | IV-24 | 11867 | .27 | Housing or commercial | Should follow development pattern set by parcels 65, 66 and 67. |
| 74X | IV-24 | 14177 | .33 | Retail and housing | Close to Jackson Square Station. Good location for convenience retail. |
| 75X | IV-24 | 249562 | 5.73 | Mixed uses; manufacturing, public facilities, open space | Site of Plant Shoe Factory which burned February 1, 1976 |
| Total | | 4,072,369 | 92.57 | | |
| Total in Corr. | | 2,268,812 | 51.17 | | |
| Total Adjacent | | 1,803,557 | 41.40 | | |

Fig. VII-3 Parcel Descriptions-Jamaica Plain FH-2

| PARCEL NO. | DWG. NO. | AREA SQ. FT. | AREA ACRES | LAND USES | COMMENTS |
|---|---|---|---|---|---|
| 1 | IV-27 | 97,500 | 2.24 | Auto-oriented commercial | Orange Line yards to be closed. Orange Line shop could be re-used. |
| 2 | IV-27 | 51,415 | 1.18 | Commercial and housing | Continuation of present uses; return to private ownership. |
| 3 & 4 | IV-27 | 24,889 | .57 | Housing and open space | Parcel 3 is DPW owned, parcel 4 is not. Houses could be lifted to new street grade and fill added to site. Triangular end of parcel 4 should be left as open space. Vacant lots in parcel 3 should be filled to street grade and sold to abutters. |
| 5 | IV-27 | 54,726 | 1.25 | Commercial or manufacturing | About 15,000 square feet of Stony Brook right of way adjacent along rear of lot could be used for non-structural purposes. |
| 6,7 & 8 | IV-27 | 38,025 | .87 | Commercial or manufacturing | About 23,000 square feet of Stony Brook right of way adjacent along rear of lots could be used for non structural purposes. Land will have to be filled to new street grade. |
| 9 | IV-27 | 99,000 | 2.27 | Green Line yards and sale to housing abutters. | A strip of land behind houses on Asticou Road should be filled to stop erosion. Land not needed for transit yards could be sold to abutters to expand their house lots. |
| 10 | IV-27 | 2780 | .06 | Housing | 8 Asticou Road - a 2 family house - to be sold for rehabilitation and occupancy after street construction. |
| 11 | IV-27 | 25,700 | .59 | Mixed retail, housing and professional offices | Parcel makes transition between residential and station areas. |
| 12 | IV-27 | 40,500 | .93 | Open space | Gateway to Arboretum. |
| 13 | IV-95 | FOREST HILLS STATION LOWER LEVEL | | | Approximately 50,000 square feet of retail catering to station users, local residents and passing auto traffic. Some short term parking provided (see architectural drawings). |
| 14 | IV-95 | FOREST HILLS STATION UPPER LEVEL | | | Approximately 18,000 square feet of retail facing pedestrian path between bus and rail terminals, short term parking at kiss and ride zone. |
| 15 | IV-27 | 60,000 | 1.38 | Open space and plaza | Could be used for temporary outdoor shows, exhibitions, markets, etc. |
| 16X | IV-27 | 111,900 | 2.57 | Retail, office, motel, housing, or parking garage, could be mixed use complex | Privately owned. Developer might purchase additional properties on Hyde Park Avenue to expand area and gain frontage. Connection to station via pedestrian bridge is possible. |

Fig. VII-3 Parcel Descriptions-Jamaica Plain FH-2 (Continued)

| PARCEL NO. | DWG. NO. | AREA SQ. FT. | AREA ACRES | LAND USES | COMMENTS |
|---|---|---|---|---|---|
| 17 | IV-27 | 20,000 | .46 | Open space | Relocate commercial parking to station deck. Landscaping should be low to maintain sight lines for traffic. |
| 18 | IV-27 | | | Open space or institutional | Relocate commerical parking to station deck. Reserve site for future municipal uses. |
| 19X | IV-28 | 740,000 | 16.99 | MBTA garage and commercial | Some land (up to 20,000 feet) at southwest corner could be added to parcel 20 to enlarge development parcel. |
| 20 | IV-28 | 20,400 | .47 | Commercial | Corner has good visibility and large traffic volumes. Parcel area could increase to about 40,000 feet with addition from 19X. |
| 21X | IV-28 | 8500 | .28 | Commercial | Land is presently vacant. Jenney Oil (the present owner) could develop this for more tank facilities or for commercial use. |
| 22 | IV-28 | 13,200 | .30 | Commercial | Same advantages as parcel 20. Suitable for small commercial activity not needing large amounts of parking. |
| 24 | IV-28 | 12,600 | .29 | Institutional | Possible site for relocation of American Legion Hall. |
| 25 | IV-28 | 18,624 | .43 | Housing | Southern portion to be used for parking, northern portion could be a house lot for a one or two family dwelling. |
| 26 | IV-28 | 155,000 | 3.56 | Housing and/or open space | Housing development could place clusters of units at ends of dead end streets with passages through to open space. Open space could be landscaped to give each street its own distinctive area. Parking should be provided at each cul de sac. Nearest the rail right of way is the beginning of the linear open space linkage (see Sheet A-14 Chapter 7 ) which contains pedestrian walk and bikeway. A distinct landscape feature could define the boundary between this public open space and the street-related semi-public open spaces. |
| 27X | IV-28 | 29,415 | .68 | Housing | Could be assembled with parcels 29 and 30 to create a development area of 68,287 feet. |
| 29 | IV-28 | 23,051 | .53 | Housing | Could be grouped with parcels 27X and 30. |
| 30 | IV-28 | 15,821 | .36 | Housing | Could be grouped with parcels 27X and 29. Standing houses to be rehabilitated or demolished. |
| 31 | IV-28 | 3387 | .08 | Housing | Too small to develop, sell to an abutter. Could be joined with a privately owned vacant lot to the south to create a house lot for a one to three family house. |

Fig. VII-3 Parcel Descriptions-Jamaica Plain FH-2 (Continued)

| PARCEL NO. | DWG. NO. | AREA SQ. FT. | AREA ACRES | LAND USES | COMMENTS |
|---|---|---|---|---|---|
| 32 | IV-28 | 8386 | .19 | Housing | Could be developed with a one to three family house. |
| 33 | IV-28 | 4098 | .09 | Housing | Vacant lot between 32 and 33 could be purchased to expand house lot. |
| 34 | IV-28 | 19,760 | .45 | Housing related | Parcel is shallow making development difficult. Sell to abutters on Newbern Street to expand yards. |
| 35 | IV-28 | 48,500 | 1.11 | Open space and/or institutional | After allowing for walk and bikeway, useable width is about seventy feet. Possible location for community facility. |
| 36 | IV-28 | 35,500 | .81 | Open space and/or institutional | Useable width is about sixty feet. Possible location for community facility. |
| 37 | IV-28 | 41,500 | .95 | Open space or housing | Deck over tracks is not to be built at this time. Combination of parcels 35, 37 and greenbelt on west side of arterial gives an area of about 98,000 feet. |
| 38 | IV-28 | 8000 | .18 | Open space | Strip between arterial and High School. Combined with the greenbelt strip along the Arterial this makes a parcel with an area of 16,000 feet and a width of about thirty feet from building to curb line. |
| 39 | IV-28 | 11,000 | .25 | Open space | Combined with the greenbelt strip along the Arterial this makes a parcel of 32,000 feet area and about 25 feet average width. |
| 40X | IV-28 | 216,700 | 4.97 | Institutional | Site of new Southwest II district high school. |
| 41X | IV-28 | 247,400 | 5.68 | Institutional | Athletic fields for High School. |
| 42 | IV-29 | | | Open space | Included in parcel 36. |
| 43X | IV-29 | 3300 | .08 | Housing | Part of back yards will be taken for transit purposes. If possible, some adjacent land should be made available to offset the reduction. Parts of parcels 42 and 44 could be transferred. |
| 44 | IV-29 | | | Housing | Included in parcel 45 Structure to be sold for residential rehabilitation. Bishop Street can be closed and some of the land used to enlarge the rear and yard. |
| 45 | IV-29 | 44,000 | 1.01 | Housing or open space | Large frame dwelling to be sold off separately with about 10,000 feet of land. Parcel was apparently quarried or excavated at one time, then filled. Subsoil conditions may prevent development except as open space. |
| 46 | IV-29 | 6000 | .14 | Retail or housing | Close to Green Street Station. Possibly could combine retail with housing above. |
| 48T | IV-29 | GREEN | STREET | STATION | Approximately 2400 square feet of small scale convenience retail incorporated in station design. |

Fig. VII-3 Parcel Descriptions-Jamaica Plain FH-2 (Continued)

| PARCEL NO. | DWG. NO. | AREA SQ. FT. | AREA ACRES | LAND USES | COMMENTS |
|---|---|---|---|---|---|
| 49X | IV-29 | 27,800 | .64 | Retail or commercial | Arterial Street improves retail potential of this corner. Building at south end of site could remain. |
| 50 | IV-29 | 3541 | .08 | Manufacturing | Transfer to AAA salvage (adjacent to the South). |
| 51 | IV-29 | 1000 | .02 | Greenbelt | Keep as open space or sell to abutter. |
| 52 | IV-29 | 102,000 | 2.34 | Open space | Connects Johnson Playground to open space network. |
| 53 | IV-29 | 29,000 | .67 | Open space | Mostly too narrow for use other than greenbelt. Wider area at Green Street could have a small, landscaped sitting area. Curb of Amory to curb of Arterial runs from thirty to forty feet. |
| 54 | IV-29 | 23,800 | .55 | Open space | Curb of Amory to curb of Arterial runs from forty feet to about sixty feet. Area in front of Neighborhood House should get special design to make it useable and safe. |
| 55 | IV-29 | 8400 | .19 | Housing | Lot for a one to three family house. |
| 56 | IV-30 | 153,000 | 3.51 | Open space | 130 foot width compares with about 175 foot width at present. Suitable for medium scale playfields. |
| 57 | IV-30 | 6100 | .14 | Open space | Becomes part of Greenbelt. |
| 58X | IV-30 | 12,480 | .29 | Open space or housing | Could be incorporated in open space system or could be sold to abutters to expand yards. |
| 59 | IV-30 | B O Y L S T | O N S T | R E E T S T A T I O N | Approximtely 2400 square feet of small scale convenience retail incorporated in station design. |
| 60X | IV-30 | 21,697 | .50 | Retail or housing related | Could combine retail and housing |
| 61X | IV-30 | 4550 | .10 | Retail | Small size limits development to single story retail. Eventually this entire block might be assembled for a more coordinated mixed-use development. |
| 62X | IV-30 | 30,879 | .71 | Housing or institutional | Closure of Lamartine Street means development must front on Danforth. Suitable for apartments, elderly housing or nursing home. |
| 63 | IV-30 | 64,100 | 1.47 | Open space and housing or institutional | Parcel incorporates land recovered from Lamartine Street right of way. Utility easements will have to be maintained. Open space linkage should be provided for, however, balance of site could be developed in conjunction with parcel 62X. |

Fig. VII-3 Parcel Descriptions-Jamaica Plain FH-2 (Continued)

| PARCEL NO. | DWG. NO. | AREA SQ. FT. | AREA ACRES | LAND USES | COMMENTS |
|---|---|---|---|---|---|
| 64 | IV-30 | 12,500 | .29 | Greenbelt | Not wide enough for active use. Merge into greenbelt system. |
| 65 | IV-30 | 14,202 | .33 | Housing or commercial | Should have same treatment as parcel 66. Potential early development site. |
| 66 | IV-30 | 48,117 | 1.10 | Housing or commercial | Parking could occur on parcel 67 to permit better quality development here. Potential early development site. |
| 67 | IV-30 | 92,600 | 2.13 | Housing or commercial | Without decking over tracks the noise environment and shallowness of the site limits development to very minor commercial (auto parts and repairs, small warehouses and distributors, etc.). Housing could not occur until decking over tracks is feasible. |
| 68 | IV-30 | --- | -- | Greenbelt | Open space linkage moves entirely to East side of tracks here to take advantage of open space around 125 Amory elderly housing. When decking over tracks is feasible, parcels 65 through 74X plus the deck area could be combined to make two related mixed use development parcels of approximately 11 acres total area. |
| 69 | IV-30 | 15,800 | .36 | Open space, commercial or manufacturing | Poor vehicular access discourages development. Combine with parcel 71. |
| 71 | IV-31 | 79,000 | 1.81 | Mixed retail and commercial | Development must allow for pedestrian walk and bikeway to connect from parcel 69 through to an appropriate point on Centre Street. |
| 73X | IV-31 | 11,867 | .27 | Housing or commercial | Should follow development pattern set by parcels 65, 66 and 67. |
| 74X | IV-31 | 14,177 | .33 | Retail and housing | Close to Jackson Square Station. Good location for convenience retail. |
| 75X | IV-31 | 249,562 | 5.73 | Mixed uses: manufacturing, public facilities, open space | Site of Plant Shoe Factory which burned February 1, 1976. |
| Total | | 3,426,749 | 78.44 | | |
| Total in Corr. | | 1,696,522 | 38.72 | | |
| Total Adjacent | | 1,730,227 | 39.72 | | |

Fig. VII-4 Parcel Descriptions-Jamaica Plain FH-3

| PARCEL NO. | DWG. NO. | AREA SQ. FT. | AREA ACRES | LAND USES | COMMENTS |
|---|---|---|---|---|---|
| 1 | IV-34 | 115,000 | 2.64 | Auto-oriented commercial | Orange Line yards to be closed. Orange Line shop could be re-used. |
| 2 | IV-34 | 51,415 | 1.18 | Commercial and housing | Continuation of present uses; return to private ownership. |
| 3 | IV-34 | 10,189 | .23 | Housing | Continuation of present uses; return to private ownership. |
| 4 | IV-34 | 36,000 | .83 | Open space | Vacant land (formerly Gemini Motors) should be landscaped. Embankment slope prevents active usage. |
| 5 | IV-34 | 54,726 | 1.25 | Commercial or manufacturing | About 15,000 feet of Stony Brook right of way adjacent along rear of lot could be used for non-structural purposes. |
| 6 | IV-34 | 6273 | .14 | Retail or commercial | Could be sold to abutters or redeveloped. About 1500 feet of Stony Brook right of way adjacent along rear of lot could be used for non-structural purposes. |
| 8 | IV-34 | 7600 | .17 | Commercial or open space | About 15,000 feet of Stony Brook right of way adjacent along rear of lot could be used for non-structural purposes making a lot area of 22,600 feet. |
| 9 | IV-34 | 99,000 | 2.27 | Green Line yards and sale to residential abutters. | A strip of land behind houses on Asticou Road should be filled to stop erosion. Land not needed for transit yards could be sold to abutters to expand their house lots. |
| 10 | IV-34 | 2780 | .06 | Housing | 8 Asticou Road - a 2 family house - to be sold for rehabilitation and occupancy after street construction. |
| 11 | IV-34 | 25,700 | .59 | Mixed retail, housing and professional offices | Parcel makes transition between residential and station areas. |
| 12 | IV-34 | 40,500 | .93 | Open spaces | Gateway to Arboretum |
| 13 | IV-93 | FOREST HILLS STATION LOWER LEVEL | | | Does not exist in this alternative. |
| 14 | IV-93 | FOREST HILLS STATION UPPER LEVEL | | | Approximately 10,000 square feet of retail faces pedestrian path between bus and rail terminals, short term parking at kiss and ride zone. |
| 15 | IV-34 | 60,000 | 1.38 | Open space and retail | Part of area under tracks could be enclosed to create a retail area of about 15,000 feet. |

Fig. VII-4 Parcel Descriptions-Jamaica Plain FH-3 (Continued)

| PARCEL NO. | DWG. NO. | AREA SQ. FT. | AREA ACRES | LAND USES | COMMENTS |
|---|---|---|---|---|---|
| 16X | IV-34 | 111,900 | 2.57 | Retail, office, motel, housing or parking garage. Could be a mixed use complex | Privately owned. Developer might purchase additional properties on Hyde Park Avenue to expand area and gain frontage. Connection to station via pedestrian bridge is possible. |
| 17 | IV-34 | 20,000 | .46 | Open space | Relocate commercial parking to station deck or to parcel 16X commercial parking garage. Landscaping should be low to maintain sight lines for traffic. |
| 18 | IV-34 | 40,000 | .92 | Open space or institutional | Relocate commercial parking to station deck or to parcel 16X commercial parking garage. Reserve site for future municipal uses. |
| 19X | IV-35 | 740,000 | 16.99 | MBTA garage and retail | Some land (up to 20,000 feet) at southwest corner could be developed for commercial use. Green space strip should be reserved from Washington to Franklin Park along Morton Street. |
| 20X & 21X | IV-35 | 43,700 | 1.00 | Commercial | Land is presently vacant. Jenney Oil (the present owner) could develop this for more tank facilities or for commercial use, |
| 22 | IV-35 | 25,600 | .59 | Commercial | This parcel could be sold to Jenney Oil for more tank facilities or it could be combined with 20X and 21X to make a development parcel with an area of 69,300 feet. |
| 23 | IV-35 | 99,000 | 2,27 | Industrial | Very poor access - only possible disposition is sale to abutters (mainly industrial). Embankment slope limits usefulness. |
| 24 | IV-35 | 12,600 | .29 | Institutional | Possible site for relocation of American Legion Hall. |
| 25 | IV-35 | 18,624 | .43 | Housing | Southern portion to be used for parking, northern portion could be a house lot for a one or two family dwelling. |
| 26 | IV-35 | 182,800 | 4.20 | Housing and/or open space | Housing development could place clusters of units at ends of dead end streets with passages through to open space. Open space could be landscaped to give each street its own distinctive area. Parking should be provided at each cul de sac. Nearest the rail right of way is the beginning of the linear open space linkage (See Sheet A-14 in Chapter 7 ) which contains pedestrian walk and bikeway. A distinct landscape feature could define the boundary between this public open space and the neighborhood-related semi-public open spaces. |
| 27X | IV-35 | 29,415 | .68 | Housing | Could be assembled with parcels 29 and 30 to create a development area of 68,287 feet. |
| 28 | IV-35 | 33,500 | .77 | Open space/slope | Embankment slope suitable for landscape but not for active use. Walk and bikeway at foot of slope near Call Street. |

Fig. VII-4 Parcel Descriptions-Jamaica Plain FH-3 (Continued)

| PARCEL NO. | DWG. NO. | AREA SQ. FT. | AREA ACRES | LAND USES | COMMENTS |
|---|---|---|---|---|---|
| 29 | IV-35 | 23,051 | .53 | Housing | Could be grouped with parcels 27X and 30. |
| 30 | IV-35 | 15,821 | .36 | Housing | Could be grouped with parcels 27X and 29. Standing houses to be rehabilitated or demolished. |
| 31 | IV-35 | 3387 | .08 | Housing | Too small to develop, sell to an abutter. Could be joined with a privately owned vacant lot to the south to create a house lot for a one to three family house. |
| 32 | IV-35 | 8386 | .19 | Housing | Could be developed with a one to three family house. |
| 33 | IV-35 | 4098 | .09 | Housing | Vacant lot between 32 and 33 could be purchased to expand house lot. |
| 34 | IV-35 | 19,760 | .45 | Housing | Parcel is shallow making development difficult. Sell to abutters on Newbern Street to expand yards. |
| 35 | IV-35 | 83,200 | 1.91 | Open space or housing | After allowing for walk and bikeway, useable width is about 150 feet. Embankment slope is about forty feet wide reducing the flat area to about 100 feet of useable width. Development should be coordinated with parcel 26 to insure that a children's playground is available at at least one location. |
| 36 | IV-35 | 70,500 | 1.62 | Open space or housing | Embankment encroaches same as parcel 35. Useable width is about 100 feet. |
| 38 | IV-35 | 20,300 | .47 | Open space | Mostly at level of old embankment about 15 feet above McBride and Williams. |
| 39 | IV-35 | 22,500 | .52 | Open space /slope | Mostly embankment side with sharp slope. |
| 40X | IV-35 | 216,700 | 4.97 | Institutional | Site of new Southwest II district high school. |
| 41X | IV-35 | 247,400 | 5.68 | Institutional | Athletic fields for high school. |
| 42 | IV-36 | 5735 | .13 | Housing | Unsuitable for rehabilitation. Make available to city for improvement of Everett/Call Street intersection. Sell remaining land to abutter. |
| 43X | IV-36 | 4793 | .11 | Housing | Probably will not be affected under this option. Continue in present use. |
| 44 | IV-36 | 3060 | .07 | Housing | Brick townhouse suitable for rehabilitation. |
| 45 | IV-36 | 51,767 | 1.19 | Housing or open space | Includes a large frame dwelling which may be sold off separately. Parcel was apparently quarried or excavated at one time, then filled. Subsoil conditions may prevent development except as open space. |
| 46 | IV-36 | 8563 | .20 | Retail or housing | Close to Green Street Station. Could combine retail with housing above. |
| 47 | IV-36 | 3000 | .07 | Open space or parking | Too shallow for development. |

Fig. VII-4 Parcel Descriptions-Jamaica Plain FH-3 (Continued)

| PARCEL NO. | DWG. NO. | AREA SQ. FT. | AREA ACRES | LAND USES | COMMENTS |
|---|---|---|---|---|---|
| 67 | IV-37 | 92,600 | 2.13 | Commercial | Shallowness of site and grade changes limit development to very minor commercial (auto parts and repairs, small warehouses and distributors, etc.) |
| 68 | IV-37 | 52,000 | 1.19 | Open space /slope | Mostly embankment slope, too steep and narrow for active use, pedestrian walk and bike path at foot of embankment with connections to 125 Amory elderly housing complex. |
| 69 | IV-37 | 55,500 | 1.27 | Open space, commercial or manufacturing | Poor vehicular access discourages development. Develop in conjunction with parcels 70X and 71 or leave as open space. |
| 70X | IV-38 | 38,130 | .88 | Commercial or manufacturing | Could be developed for a higher grade of commercial use or could be combined with parcel 71 for a mixed use development. |
| 71 | IV-38 | 100,500 | 2.31 | Mixed retail and commercial | Development must allow for pedestrian walk and bikeway to connect from parcel 68 past parcel 69 and through to an appropriate point on Centre Street. |
| 72 | IV-38 | 30,931 | .71 | Mixed retail and commercial | Should be developed in conjunction with parcel 71. |
| 73X | IV-38 | 11,867 | .27 | Commercial or manufacturing | Should follow development pattern set by parcels 65, 66 and 67. |
| 74X | IV-38 | 14,177 | .33 | Retail and housing | Close to Jackson Square Station. Good location for convenience retail. |
| 75X | IV-38 | 249,562 | 5.73 | Mixed uses: manufacturing, public facilities, open space | Site of Plant Shoe Factory which burned February 1, 1976 |
| Total | | 4,090,235 | 93.90 | | |
| Total in Corr. | | 2,288,985 | 52.55 | | |
| Total Adjacent | | 1,801,250 | 41.35 | | |

Fig. VII-4 Parcel Descriptions-Jamaica Plain FH-3 (Continued)

| PARCEL NO. | DWG. NO. | AREA SQ. FT. | AREA ACRES | LAND USES | COMMENTS |
|---|---|---|---|---|---|
| 48 | IV-36 | GREEN STREET STATION | | | Approximately 2400 square feet of small scale convenience retail incorporated in station design. |
| 49X | IV-36 | 24,000 | .55 | Retail or commercial | Fronts on Station loop street. Building at south end of site could remain. |
| 52 | IV-36 | 175,500 | 4.03 | Open space | 120 foot width could accommodate some active open space uses. Undulating topography links to Johnson Playground. |
| 53 | IV-36 | 52,500 | 1.21 | Open space/slope | Mostly embankment slope, too steep and narrow for active use. |
| 54 | IV-36 | 49,500 | 1.14 | Open space/slope | Mostly embankment slope, too steep and narrow for active use. |
| 56 | IV-37 | 220,000 | 5.05 | Open space | Maintains present 175 foot width. Suitable for large scale playfields. |
| 57 | IV-37 | 8200 | .19 | Open space/slope | Mostly embankment slope, too steep and narrow for active use. |
| 58X | IV-37 | 12,480 | .29 | Open space or housing related | Could be incorporated in open space system or could be sold to abutters to expand yards. |
| 59 | IV-37 | BOYLSTON STREET STATION | | | Approximately 2400 square feet of small scale convenience retail incorporated in station design. |
| 60X | IV-37 | 21,697 | .50 | Retail or housing | Could combine retail and housing |
| 61X | IV-37 | 4550 | .10 | Retail | Small size limits development to single story retail. Eventually this entire block might be assembled for a more coordinated mixed use development. |
| 62X | IV-37 | 30,879 | .71 | Housing, institutional or commercial. | Suitable for apartments, elderly housing, nursing home or commercial. |
| 63 | IV-37 | 65,500 | 1.50 | Open space | Ninety to 110 foot width permits small to medium scale active open space uses. Embankment reduces usability. |
| 64 | IV-37 | 39,500 | .91 | Commercial | Stony Brook conduit prohibits construction. Embankment reduces usability. Sell to abutters for minor expansion or parking. |
| 65 | IV-37 | 14,202 | .33 | Commercial | Should have same treatment as parcel 66. |
| 66 | IV-37 | 48,117 | 1.10 | Commercial | Parking could occur on parcel 67 to allow denser development here. |

Fig. VII-5 Parcel Description-Jamaica Plain FH-4

| PARCEL NO. | DWG. NO. | AREA SQ. FT. | AREA ACRES | LAND USES | COMMENTS |
|---|---|---|---|---|---|
| 1 | IV-41 | 115,000 | 2.64 | Auto-oriented commercial | Orange Line yards to be closed. Orange Line shop could be re-used. |
| 2 | IV-41 | 51,415 | 1.18 | Commercial and housing | Continuation of present uses return to private ownership. |
| 3 | IV-41 | 10,189 | .23 | Housing | Continuation of present uses; return to private ownership. |
| 4X | IV-41 | | | Housing and open space | Existing house will remain as is. Vacant land (formerly Gemini Motors) should be landscaped. |
| 5 | IV-41 | 54,726 | 1.25 | Commercial or manufacturing | About 15,000 feet of Stony Brook right of way adjacent along rear of lot could be used for non-structural purposes. |
| 6 | IV-41 | 6273 | .14 | Retail or commercial | Could be sold to abutters or redeveloped. About 1500 feet of Stony Brook right of way adjacent along rear of lot could be used for non-structural purposes. |
| 8 | IV-41 | 7600 | .17 | Commercial or open space | About 15,000 feet of Stony Brook right of way adjacent along rear of lot could be used for non-structural purposes making a lot area of 22600 feet. |
| 9 | IV-41 | 99,000 | 2.27 | Green Line yards and sale to residential abutters | A strip of land behind houses on Asticou Road should be filled to stop erosion. Land not needed for transit yards could be sold to abutters to expand their house lots. |
| 10 | IV-41 | 2780 | .06 | Housing | 8 Asticou Road - a 2 family house - to be sold for rehabilitation and occupancy after street construction. |
| 11 | IV-41 | 25,700 | .59 | Mixed retail, housing and professional offices | Parcel makes transition between residential and station areas. |
| 12 | IV-41 | 40,500 | .93 | Open space | Gateway to Arboretum |
| 13 | IV-93 | FOREST HILLS STATION LOWER LEVEL | | | Does not exist in this alternative. |
| 14 | IV-93 | FOREST HILLS STATION UPPER LEVEL | | | Approximately 10,000 square feet of retail faces pedestrian path between bus and rail terminals, short term parking at kiss and ride zone. |
| 15 | IV-41 | 60,000 | 1.38 | Open space and retail | Part of area under tracks could be enclosed to create a retail area of about 15,000 feet. |

Fig. VII-5 Parcel Description-Jamaica Plain FH-4 (Continued)

| PARCEL NO. | DWG. NO. | AREA SQ. FT. | AREA ACRES | LAND USES | COMMENTS |
|---|---|---|---|---|---|
| 16X | IV-41 | 111,900 | 2.57 | Retail, office, motel, housing or parking garage. Could be a mixed use complex. | Privately owned. Developer might purchase additional properties on Hyde Park Avenue to expand area and gain frontage. Connection to station via pedestrian bridge is possible. |
| 17 | IV-41 | 20,000 | .46 | Open space | Relocate commercial parking to station deck or to parcel 16X commercial parking garages. Landscaping should be low to maintain sight lines for traffic |
| 18 | IV-41 | 40,000 | .92 | Open space or institutional | Relocate commercial parking to station deck or to parcel 16X commercial parking garage. Reserve site for future municipal uses. |
| 19X | IV-42 | 740,000 | 16.99 | MBTA garage and commercial | Some land (up to 20,000 feet) at southwest corner could be added to parcel 20 to enlarge development parcel. Green space strip should be reserved from Washington to Franklin Park along Morton Street. |
| 20 | IV-42 | 20,400 | .47 | Commercial | Corner has good visibility and large traffic volumes. Parcel area could increase to about 40,000 feet with addition from 19X. |
| 21X | IV-42 | 8500 | .28 | Commercial | Land is presently vacant. Jenney Oil (the present owner) could develop this for more tank facilities or for commercial use. |
| 22 | IV-42 | 13,200 | .30 | Commercial | Same advantages as parcel 20. Suitable for small retail activity not needing large amounts of parking. |
| 23 | IV-42 | 92,000 | 2.11 | Industrial | Very poor access, only possible disposition is sale to abutters (mainly industrial). Embankment slope limits usefulness. |
| 24 | IV-42 | 12,600 | .29 | Institutional | Possible site for relocation of American Legion Hall. |
| 25 | IV.42 | 18,624 | .43 | Housing | Southern portion to be used for parking, northern portion could be a house lot for a one or two family dwelling. |
| 26 | IV.42 | 144,500 | 3.32 | Housing and/or open space | Housing development could place clusters of units at ends of dead end streets with passages through to open space. Parking should be provided at each cul de sac. Land rises to the East, then drops down to the arterial street. A major north-south pedestrian walk and bikeway parallels the arterial. |
| 27X | IV.42 | 27,300 | .63 | Housing | Could be assembled with parcels 29 and 30 to create a development area of 66,700 feet. |
| 29 | IV.42 | 25,700 | .59 | Housing | Could be grouped with parcels 27X and 30. |
| 30 | IV.42 | 13,700 | .31 | Housing | Could be grouped with parcels 27X and 29. Standing houses to be rehabilitated or demolished. |

Fig. VII-5 Parcel Description-Jamaica Plain FH-4 (Continued)

| PARCEL NO. | DWG. NO. | AREA SQ. FT. | AREA ACRES | LAND USES | COMMENTS |
|---|---|---|---|---|---|
| 31 | IV-42 | 3387 | .08 | Housing related | Too small to develop, sell to an abutter. Could be joined with a privately owned vacant lot to the south to create a house lot for a one to three family house. |
| 32 | IV-42 | 8386 | .19 | Housing | Could be developed with a one to three family house. |
| 33 | IV-42 | 4098 | .09 | Housing | Vacant lot between 32 and 33 could be purchased to expand house lot. |
| 34 | IV-42 | 19,760 | .45 | Housing related | Parcel is shallow making development difficult, Sell to abutters on Newbern Street to expand yard. |
| 35 | IV-42 | 33,500 | .77 | Open space | Useable width is about fifty feet. |
| 36 | IV-42 | 20,500 | .47 | Open space | Useable width is about 45 feet. Incorporates parcel 42. |
| 38 | IV-42 | 20,300 | .47 | Open space | Mostly at level of old embankment about 15 feet above McBride and Williams. |
| 39 | IV-42 | 22,500 | .52 | Open space/slope | Mostly embankment side with sharp slope. |
| 40X | IV-42 | 216,700 | 4.97 | Institutional | Site of new Southwest II district high school. |
| 41X | IV-42 | 247,400 | 5.68 | Institutional | Athletic fields for High School. |
| 43X | IV-43 | --- | | Housing or open space | Part of parcel 45. |
| 44 | IV-43 | --- | | Housing or open space | Part of parcel 45. |
| 45 | IV-43 | 38,200 | .88 | Housing or open space | Incorporates parcels 43 and 44. Includes a large frame dwelling which may be sold off separately. Parcel was apparently quarried or excavated at one time, then filled. Subsoil conditions may prevent development except as open space. |
| 46 | IV-43 | 5500 | .13 | Retail or housing | Close to Green Street Station and visible from Arterial. Could combine retail with housing above. |
| 47 | IV-43 | 12,500 | .29 | Retail, housing or commercial | Close to Green Street Station and fronting on Arterial. Could combine retail with housing above. |
| 48 | IV-43 | G R E E N | S T R E E | T S T A T I O N | Approximately 2400 square feet of small scale convenience retail incorporated in station design. |
| 49X | IV-43 | 27,800 | .64 | Retail or commercial | Fronts on Station loop street. Building at south end of site could remain. |

Fig. VII-5 Parcel Description-Jamaica Plain FH-4 (Continued)

| PARCEL NO. | DWG. NO. | AREA SQ. FT. | AREA ACRES | LAND USES | COMMENTS |
|---|---|---|---|---|---|
| 52 | IV-43 | 57,500 | 1.32 | Open space/slope | Narrow and steeply sloped. Only useable as greenbelt. |
| 53 | IV-43 | 51,000 | 1.17 | Open space/slope | Mostly embankment slope. Too steep and narrow for active use. |
| 54 | IV-43 | 58,500 | 1.34 | Open space/slope | Mostly embankment slope. Too steep and narrow for active use. |
| 55 | IV-43 | 7000 | .16 | Housing | Lot for a one or two family house. |
| 56 | IV-44 | 68,400 | 1.57 | Open space | Eightly foot width limits active use to small scale play areas. Present width in this area is about 175 feet. |
| 57 | IV-44 | 8200 | .19 | Open space/slope | Mostly embankment slope. Too steep and narrow for active use. |
| 58X | IV-44 | 12,480 | .29 | Open space or housing | Could be incorporated in open space system or could be sold to abutters to expand yards. |
| 59 | IV-44 | B O Y L S T O N S T R E E T S T A T I O N | | | Approximately 2400 square feet of small scale convenience retail incorporated in station design. |
| 60X | IV-44 | 21,697 | .50 | Retail or housing | Could combine retail and housing |
| 61X | IV-44 | 4550 | .10 | Retail | Small size limits development to single story retail. Eventually this entire block might be assembled for a more coordinated mixed use development. |
| 62X | IV-44 | 30,879 | .71 | Housing, insitutional or commercial | Closure of Lamartine Street means development must front on Danforth. Suitable for apartments, elderly housing, nursing home or commercial. Latter use would require additional curb cut on arterial. |
| 63 | IV-44 | 83,000 | 1.91 | Housing, institutional or commercial plus open space | Could be partially developed in conjunction with parcel 62X. Open space linkage should be accommodated parallel to arterial. Commercial use would require additional curb cut on arterial. |
| 64 | IV-44 | 28,200 | .65 | Commercial | Sell to abutters for minor expansion or parking. |
| 65 | IV-44 | 14,202 | .33 | Commercial | Should have same treatment as parcel 66. Potential early development site. |
| 66 | IV-44 | 48,117 | 1.10 | Commercial | Parking could occur on parcel 67 to allow denser development here. Potential early development site. |
| 67 | IV-44 | 92,600 | 2.13 | Commercial | Shallowness of site and grade changes limit development to very minor commercial (auto parts and repairs, small warehouses and distributors, etc.) |
| 69 | IV-44 | 15,800 | .36 | Open space, commercial or manufacturing | Poor vehicular access discourages development. Combine with parcel 71. |

Fig. VII-5 Parcel Description-Jamaica Plain FH-4 (Continued)

| PARCEL NO. | DWG. NO. | AREA SQ. FT. | AREA ACRES | LAND USES | COMMENTS |
|---|---|---|---|---|---|
| 71 | IV-45 | 79,000 | 1.81 | Mixed retail and commercial | Development must allow for pedestrian walk and bikeway to connect from parcel 69 through to an appropriate point on Centre Street. |
| 73X | IV-45 | 11,867 | .27 | Commercial | Should follow development pattern set by parcels 65, 66 and 67. |
| 74X | IV-45 | 14,177 | .33 | Retail and housing | Close to Jackson Square Station. Good location for convenience retail. |
| 75X | IV-45 | 249,562 | 5.73 | Mixed uses: manufacturing, public facilities,open space | Site of Plant Shoe Factory which burned February 1, 1976. |
| Total | | 3,398,869 | 78.03 | | |
| Total in Corr. | | 1,785,957 | 41.00 | | |
| Total Adjacent | | 1,612,912 | 37.03 | | |

Fig. VII-6 Parcel Descriptions-Jamaica Plain FH-5

| PARCEL NO. | DWG. NO. | AREA SQ. FT. | AREA ACRES | LAND USES | COMMENTS |
|---|---|---|---|---|---|
| 1 | IV-49 | 97,500 | 2,24 | Auto-oriented commercial | Orange Line yards to be closed. Orange Line shop could be re-used. |
| 2 | IV-49 | 51,415 | 1.18 | Commercial and housing | Continuation of present uses: return to private ownership. |
| 3 & 4 | IV-49 | 24,889 | .57 | Housing and open space | Parcel 3 is DPW owned, parcel 4 is not. Houses could be lifted to new street grade and fill added to site. Triangular end of parcel 4 should be left as open space. Vacant lots in parcel 3 should be filled to street grade and sold to abutters. |
| 5 | IV-49 | 54,726 | 1.25 | Commercial or manufacturing | About 15,000 square feet of Stony Brook right of way adjacent along rear of lot could be used for non-structural purposes. |
| 7X | IV-49 | 24,152 | .55 | Housing | Parcel 6 and Stony Brook right of way used to construct alleyways for cars. Parcel 7X includes houses and one business which will not be taken but will have new access provisions from the raised street. The fruit and vegetable stand might be raised to street level if this is necessary for business purposes. |
| 8 | IV-49 | 8,501 | .20 | Commercial | Parcel 8 could be filled and returned to its present use, however, the duration of the construction period will be long enought that a permanent relocation is preferable for business continuity. Note that the two structures appear to be on railroad and MDC land. These will have to be removed. The resulting parcel 8 should be graded up to the raised Washington Street and down at the rear to the newly constructed alleway. This would permit a two story structure with access at both upper and lower levels. Note that this solution for parcels 6, 7 and 8 is interchangeable with the solution described for alternatives 1 and 2 The choice between solutions can be made at a later date after further engineering studies and consultation with the property owners involved. |
| 9 | IV-49 | 99,000 | 2.27 | Green Line yards and sale to housing abutters | A strip of land behind houses on Asticou Road should be filled to stop erosion. Land not needed for Green Line yards could be sold to abutters to expand their house lots. |
| 10 | IV-49 | 2,780 | .06 | Housing | 8 Asticou Road - a 2 family house - to be sold for rehabilitation and occupancy after street construction. |
| 11 | IV-49 | 25,700 | .59 | Mixed retail, Housing and professional offices | Parcel makes transition between residential and station areas. |

Fig. VII-6 Parcel Descriptions-Jamaica Plain FH-5 (Continued).

| PARCEL NO. | DWG. NO. | AREA SQ. FT. | AREA ACRES | LAND USES | COMMENTS |
|---|---|---|---|---|---|
| 12 | IV-49 | 40,500 | .93 | Open Space | Gateway to Arboretum. |
| 13 | IV-95 | FOREST HILLS STATION LOWER LEVEL | | | Approximately 50,000 square feet of retail catering to station users, local residents and passing auto traffic. Some short term parking provided (see architectural drawings). |
| 14 | IV-95 | FOREST HILLS STATION UPPER LEVEL | | | Approximately 18,000 square feet of retail facing pedestrian path between bus and rail terminals, short term parking at kiss and ride zone. |
| 15 | IV-49 | 60,000 | 1.38 | Open Space and Plaza | Could be used for temporary outdoor shows, exhibitions, markets, etc. |
| 16X | IV-49 | 111,900 | 2.57 | Retail, office, motel, housing, or parking garage, could be mixed use complex | Privately owned. Developer might purchase additional properties on Hyde Park Avenue to expand area and gain frontage. Connection to station via pedestrian bridge is possible. |
| 17 | IV-49 | 20,000 | .46 | Open Space | Relocate commercial parking to station garage. Landscaping should be low to maintain sight lines for traffic. |
| 18 | IV-49 | 40,000 | .92 | Open space or institutional | Relocate commercial parking to station garage. Reserve site for future municipal uses. |
| 19X | IV-50 | 730,000 | 16.76 | MBTA garage and commercial | Some land (up to 20,000 feet) at southwest corner could be added to parcel 20 to enlarge development parcel. |
| 20 | IV-50 | 29,800 | .68 | Commercial | Corner has good visibility and large traffic volumes. Could combine with parcel 21X. |
| 21X | IV-50 | 8,500 | .28 | Commercial | Land is presently vacant. Jenney Oil (the present owner) could develop this for more tank facilities or for commercial use. Could combine with parcels 20, |
| 22 | IV-50 | 25,000 | .57 | Commercial | Same advantages as parcel 20. Suitable for small commercial activity not needing large amounts of parking. |
| 24 | IV-50 | 11,600 | .27 | Institutional | Possible site for relocation of American Legion Hall. |
| 25 | IV-50 | 18,624 | .43 | Housing | Southern portion to be used for parking, northern portion could be a house lot for a one or two family dwelling. |

Fig. VII-6 Parcel Descriptions-Jamaica Plain FH-5 (Continued)

| PARCEL NO. | DWG. NO. | AREA SQ. FT. | AREA ACRES | LAND USES | COMMENTS |
|---|---|---|---|---|---|
| 26 | IV-50 | 155,000 | 3.56 | Housing and/or open space | Housing development could place clusters of units at ends of dead end streets with passages through to open space. Open space could be landscaped to give each street its own distinctive area. Parking should be provided at each cul de sac.<br>Nearest the rail right of way is the beginning of the linear open space linkage (see Figure A-15 in Section 7.6 and in appendix) which contains pedestrian walk and bikeway. A distinct landscape feature could define the boundary between this public open space and the street-related semi-public open spaces. |
| 27X | IV-50 | 29,415 | .68 | Housing | Could be assembled with parcels 29 and 30 to create a development area of 91,629 feet. Land should be filled to new street level. |
| 29 | IV-50 | 30,814 | .71 | Housing | Could be grouped with parcels 27X and 30. |
| 30 | IV-50 | 31,400 | .72 | Housing | Could be grouped with parcels 27X and 29. Standing houses to be rehabilitated or demolished. |
| 31 | IV-50 | 3,387 | .08 | Housing | Two small to develop, sell to an abutter. Could be joined with a privately owned vacant lot to the south to create a house lot for a one to three family house, or could be added to parcel 30. |
| 32 | IV-50 | 8,386 | .19 | Housing | Could be developed with a one to three family house. |
| 33 | IV-50 | 4,098 | .09 | Housing | Vacant lot between 32 and 33 could be purchased to expand house lot. Combine with parcel 33a. |
| 33a | IV-50 | 6,940 | .16 | Housing | New street grade requires that two houses be lifted and land filled and regraded. |
| 34 | IV-50 | 19,760 | .45 | Housing related | Parcel is shallow making development difficult. Sell to abutters on Newbern Street to expand yards. |
| 34a | IV-50 | 3,337 | .08 | Housing | New street grade requires that two houses be lifted and land filled and regraded. |
| 35 | IV-50 | 32,000 | .73 | Open space and/or institutional | After allowing for walk and bikeway, useable width is about seventy feet. Possible location for community facility. |

Fig. VII-6 Parcel Descriptions-Jamaica Plain FH-5 (Continued)

| PARCEL NO. | DWG. NO. | AREA SQ. FT. | AREA ACRES | LAND USES | COMMENTS |
|---|---|---|---|---|---|
| 36 | IV-50 | 32,900 | .75 | Open space and/or institutional | Useable width is about sixty feet. Possible location for community facility. Includes parcel 42. |
| 38 | IV-50 | 8,000 | .18 | Open space/slope | Strip between arterial and High School. Combined with the greenbelt strip along the Arterial this makes a parcel with an area of 16,000 feet and a width of about thirty feet from building to curb line. |
| 39 | IV-50 | 11,000 | .25 | Open space/slope | Combined with the greenbelt strip along the Arterial this makes a parcel of 32,000 feet area and about 25 feet average width. |
| 40X | IV-50 | 216,700 | 4.97 | Institutional | Site of new Southwest II district high school. |
| 41X | IV-50 | 247,400 | 5.68 | Institutional | Athletic fields for High School. |
| 42 | IV-51 | | | Open space | Included in parcel 36. |
| 43X | IV-51 | 3,300 | .08 | Housing | Part of back yards will be taken for transit purposes. If possible, some adjacent land should be made available to offset the reduction. Parts of parcels 42 and 44 could be transferred. |
| 44 | IV-51 | | | Housing | Included in parcel 45. Structure to be sold for residential rehabilitation. Bishop Street can be closed and some of the land used to enlarge the rear and yard. |
| 45 | IV-51 | 44,000 | 1.01 | Housing or open space | Includes parcel 44. Large frame dwelling to be sold off separately with about 10,000 feet of land. Parcel was apparently quarried or excavated at one time, then filled. Subsoil conditions may prevent development except as open space. |
| 46 | IV-51 | 6,000 | .14 | Retail or housing | Close to Green Street Station. Possibly could combine retail with housing above. |
| 48T | IV-51 | G R E E | N S T R | E E T S T A T I O N | Approximately 2,400 square feet of small scale convenience retail incorporated in station design. |
| 49X | IV-51 | 27,800 | .64 | Retail or commercial | Arterial Street improves retail potential of this corner. Building at south end of site could remain. |
| 50 | IV-51 | 18,700 | .43 | Retail or open space | Could be developed with - small retail structure with open space or could be left completely open. |

Fig. VII-6 Parcel Descriptions-Jamaica Plain FH-5 (Continued)

| PARCEL NO. | DWG. NO. | AREA SQ. FT. | AREA ACRES | LAND USES | COMMENTS |
|---|---|---|---|---|---|
| 51 | IV-51 | 6,100 | .14 | Greenbelt | Keep as open space or sell to abutter. |
| 52 | IV-51 | 102,000 | 2.34 | Open space | Connects Johnson Playground to open space network. |
| 53 | IV-51 | 24,600 | .56 | Open space/slope | Mostly too narrow for use other than greenbelt. Wider area at Green Street could have a small, landscaped sitting area. Curb of Amory to curb of Arterial runs from thirty to forty feet. |
| 54 | IV-51 | 52,000 | 1.19 | Open space/slope | Curb of Amory to curb of Arterial runs from forty feet to about sixty feet. Area in front of Neighborhood House should get special design to make it useable and safe. |
| 55 | IV-51 | 8,400 | .19 | Housing | Lot for a one to three family house. |
| 56 | IV-52 | 110,500 | 2.54 | Open space | 130 foot width compares with about 175 foot width at present. Suitable for medium scale playfields. |
| 57 | IV-52 | 17,000 | .39 | Open space or retail and housing | Could combine with parcel 57X. Makes transition between neighborhood and station area. |
| 57X | IV-52 | 7,731 | .18 | Open space or retail and housing | Should be combined with parcel 57 if possible. |
| 58 | IV-52 | 12,480 | .29 | Open space or housing related | Could be incorporated in open space system or could be sold to abutters to expand yards. |
| 59 | IV-52 | BOYLSTON STREET STATION | | | Approximately 2400 square feet of small scale convenience retail incorporated in station design. |
| 60X | IV-52 | 21,697 | .50 | Retail or housing related | Could combine retail and housing. Should be filled to new street level. |
| 61a | IV-52 | 4,550 | .10 | Retail | Small size limits development to single story retail. Eventually this entire block might be assembled for a more coordinated mixed-use development. |
| 61b | IV-52 | 4,413 | .10 | Housing | Lamartine Street is raised substantially. Houses could be raised and land filled in. Alternate solution would move Lamartine Street closer to tracks with a slope down to the houses at their present level. Houses need not be permanently taken in either case. |
| 62X | IV-52 | 30,879 | .71 | Housing or institutional | Closure of Lamartine Street means development must front on Danforth. Suitable for apartments, elderly housing or nursing home. |

Fig. VII-6 Parcel Descriptions-Jamaica Plain FH-5 (Continued)

| PARCEL NO. | DWG. NO. | AREA SQ. FT. | AREA ACRES | LAND USES | COMMENTS |
|---|---|---|---|---|---|
| 63 | IV-52 | 61,900 | 1.42 | Open space and housing or institutional | Parcel incorporates land recovered from Lamartine Street right of way. Utility easements will have to be maintained. Open space linkage should be provided for, however, balance of site could be developed in conjunction with parcel 62X. |
| 64 | IV-52 | 15,800 | .36 | Greenbelt | Not wide enough for active use. Merge into greenbelt system. |
| 64a | IV-52 | 7,450 | .17 | Open space | Fill to new street grade. Provides linkage between Church and Station area. |
| 65 | IV-52 | 14,202 | .33 | Housing or commercial | Should have same treatment as parcel 66. Potential early development site. |
| 65a | IV-52 | 7,983 | .18 | Housing | Could be combined with parcel 65X after filling to new street level. |
| 65X | IV-52 | 7,197 | .17 | Housing | Could be combined with parcel 65a. |
| 66 | IV-52 | 130,400 | 2.99 | Housing or commercial | Includes parcel 67. Without decking over tracks the noise environment and shallowness of the site limits development to commercial. Housing could not occur until decking over tracks is feasible. |
| 68 | IV-52 | --- | -- | Greenbelt | Open space linkage moves entirely to East side of tracks here to take advantage of open space around 125 Amory elderly housing. When decking over tracks is feasible, parcels 65 through 74X plus the deck area could be combined to make two related miexed use development parcels of approximately 11 acres total area. |
| 69 | IV-52 | 20,300 | .47 | Open space, commercial or manufacturing | Poor vehicular access discourages development. Combine with parcel 71. |
| 71 | IV-53 | 78,600 | 1.80 | Mixed retail and commercial | Development must allow for pedestrian walk and bikeway to connect from parcel 69 through to an appropriate point on Centre Street. |
| 73X | IV-53 | 11,867 | .27 | Housing or commercial | Should follow development pattern set by parcels 65,66 and 67. |
| 74 | IV-53 | 14,177 | .33 | Retail and housing | Close to Jackson Square Station. Good location for co-venience retail. |
| 75X | IV-53 | 249,562 | 5.73 | Mixed uses: manufacturing, public facilities, open space | Site of Plant Shoe Factory which burned February 1, 1976. |

Fig. VII-6 Parcel Descriptions-Jamaica Plain FH-5 (Continued)

| PARCEL NO. | DWG. NO. | AREA SQ. FT. | AREA ACRES | LAND USES | COMMENTS |
|---|---|---|---|---|---|
| Total | | 3,446,712 | 79.13 | | |
| Total in Corridor | | 1,718,612 | 39.45 | | |
| Total Adjacent | | 1,728,100 | 39.67 | | |

Fig. VII-7 Parcel Descriptions-Jamaica Plain FH-6

| PARCEL NO. | DWG. NO. | AREA SQ. FT. | AREA ACRES | LAND USES | COMMENTS |
|---|---|---|---|---|---|
| 1 | IV-56 | 97,500 | 2.24 | Auto-oriented commercial | Orange line yards to be closed. Orange Line shop could be re-used. |
| 2 | IV-56 | 51,415 | 1.18 | Commercial and Housing | Continuation of present uses: return to private ownership. |
| 3 & 4 | IV-56 | 24,889 | .57 | Housing and open space | Parcel 3 DPW owned, parcel 4 is not. Houses could be lifted to new street grade and fill added to site. Triangular end of parcel 4 should be left as open space. Vacant lots in parcel 3 should be filled to street grade and sold to abutters. |
| 5 | IV-56 | 54,726 | 1.25 | Commercial or manufacturing | About 15,000 sq. feet of Stony Brook right of way adjacent along rear of lot could be used for non-structural purposes. |
| 7X | IV-56 | 24,152 | .55 | Housing | Parcel 6 and Stony Brook right of way used to construct alleyway for cars. Parcel 7X includes houses and one business which will not be taken but will have new access provisions from the raised street. The fruit and vegetable stand might be raised to street level if this is necessary for business purposes. |
| 8 | IV-56 | 8,501 | .20 | Commercial | Parcel 8 could be filled and returned to its present use, however, the duration of the construction period will be long enought that a permanent relocation is preferable for business continuity. Note that the two structures appear to be on railroad and MDC land. These will have to be removed. The resulting parcel 8 should be graded upt to the raised Washington Street and down at the rear to the newly constructed alleyway. This would permit a two story structure with access at both upper and lower levels. Note that this solution for parcels 6, 7 & 8 is interchangeable with the solution described for alternatives 1 and 2. The choice between solutions can be made at a later date after further engineering studies and consultation with the property owners involved. |
| 9 | IV-56 | 99,000 | 2.27 | Green Line yards and sale to residential abutters | A strip of land behind houses on Asticou Road should be filled to stop erosion. Land not needed for Green Line yards could be sold to abutters to expand their house lots. |
| 10 | IV-56 | 2,780 | .06 | Housing | 8 Asticou Road-- a 2 family house -- to be sold for rehabilitation and occupancy after street construction. |
| 11 | IV-56 | 25,700 | .59 | Mixed retail, housing and professional offices | Parcel makes transition between residential and station areas. |

Fig. VII-7 Parcel Descriptions-Jamaica Plain FH-6 (Continued)

| PARCEL NO. | DWG. NO. | AREA SQ. FT. | AREA ACRES | LAND USES | COMMENTS |
|---|---|---|---|---|---|
| 12 | IV-56 | 40,500 | .93 | Open space | Gateway to Arboretum. |
| 13 | IV-95 | FOREST HILLS STATION LOWER LEVEL | | | Approximately 50,000 square feet of retail catering to station users, local residents, and passing auto traffic. Some short term parking provided (see architectural drawings). |
| 14 | IV-95 | FOREST HILLS STATION UPPER LEVEL | | | Approximately 18,000 square feet of retail facing pedestrian path between bus and rail terminals, short term parking at kiss and ride zone. |
| 15 | IV-56 | 60,000 | 1.38 | Open space and plaza | Could be used for temporary outdoor shows, exhibitions, markets, etc. |
| 16X | IV-56 | 111,900 | 2.57 | Retail, office, motel, housing or parking garage. Could be a mixed use complex. | Privately owned. Developer might purchase additional properties on Hyde Park Avenue to expand area and gain frontage. Connection to station via pedestrian bridge is possible. |
| 17 | IV-56 | 20,000 | .46 | Open space | Relocate commercial parking to station garage. Landscaping should be low to maintain sight lines for traffic. |
| 18 | IV-56 | 40,000 | .92 | Open space or institutional | Relocate commercial parking to station garage. Reserve site for future municipal uses. |
| 19X | IV-57 | 740,000 | 16.99 | MBTA garage and commercial | Some land (up to 20,000 feet) at southwest corner could be developed for commercial use. Green space strip should be reserved from Washington to Franklin Park along Morton Street. |
| 20X & 21S | IV-57 | 43,700 | 1.00 | Commercial | Land is presently vacant. Jenney Oil (the present owner) could develop this for more tank facilities or for commercial uses. Land would have to be filled to raised street level. |
| 22 | IV-57 | 25,000 | .57 | Commercial | This parcel could be sold to Jenney Oil for more tank facilities or it could be combined with 20X and 21X to make a development parcel with an area of 68,700 feet. |
| 23 | IV-57 | 111,000 | 2.55 | Industrial | Very poor access means only possible disposition is sale to abutters (mainly industrial). |
| 24 | IV-57 | 11,600 | .27 | Institutional | Possible site for relocation of American Legion Hall. |

Fig. VII-7 Parcel Descriptions-Jamaica Plain FH-6 (Continued)

| PARCEL NO. | DWG. NO. | AREA SQ. FT. | AREA ACRES | LAND USES | COMMENTS |
|---|---|---|---|---|---|
| 25 | IV-57 | 18,624 | .43 | Housing | Southern portion to be used for parking, northern portion could be a house lot for a one or two family dwelling. |
| 26 | IV-57 | 155,000 | 3.56 | Housing and/or open space | Housing development could place clusters of units at ends of dead end streets with passages through to open space. Open space could be landscaped to give each street its own distinctive area. Parking should be provided at each cul de sac.<br>Nearest the rail right of way is the beginning of the linear open space linkage (See figure A-15 in section 7.6 and in appendix which contains pedestrian walk and bikeway. A distinct landscape feature could define the boundary between this public open space and the street-related semi-public open spaces. |
| 27X | IV-57 | 29,415 | .68 | Housing | Could be assembled with parcels 29 and 30 to create a development area of 68,287 feet. Land should be filled to new street level. |
| 29 | IV-57 | 30,814 | .71 | Housing | Could be grouped with parcels 27X and 30. |
| 30 | IV-57 | 15,821 | .36 | Housing | Could be grouped with parcels 27X and 29. Standing houses to be rehabilitated or demolished. |
| 31 | IV-57 | 3,387 | .08 | Housing | Too small to develop, sell to an abutter. Could be joined with a privately owned vacant lot to the south to create a house lot for a one to three family house. |
| 32 | IV-57 | 8,386 | .19 | Housing | Could be developed with a one to three family house. |
| 33 | IV-57 | 4,098 | .09 | Housing | Vacant lot between 32 and 33 could be purchased to expand house lot. Combine with parcel 33a. |
| 33a | IV-57 | 6,940 | .16 | Housing | New street grade requires that two houses be lifted and land filled and regraded. |
| 34 | IV-57 | 19,760 | .45 | Housing related | Parcel is shallow making development difficult. Sell to abutters on Newbern Street to expand yards. |
| 34a | IV-57 | 3,337 | .08 | Housing | New street grade requires that two houses be lifted and filled and regraded. |

Fig. VII-7 Parcel Descriptions-Jamaica Plain FH-6 (Continued)

| PARCEL NO. | DWG. NO. | AREA SQ. FT. | AREA ACRES | LAND USES | COMMENTS |
|---|---|---|---|---|---|
| 35 | IV-57 | 48,500 | 1.11 | Open space and/or institutional | After allowing for walk and bikeway, useable width is about seventy feet. Possible location for community facility. |
| 36 | IV-57 | 49,000 | 1.12 | Open space and/or institutional | Useable width is about sixty feet. Possible location for community facility. |
| 38 | IV-57 | 40,500 | .93 | Open space | Transfer to High School use. |
| 39a & 39b | IV-57 | 64,900 | 1.49 | Open space | Transfer to High School use. Probably will provide the major pedestrian route between High School and Green Street station. |
| 40X | IV-57 | 216,700 | 4.97 | Institutional | Site of new Southwest II district High School. |
| 41X | IV-57 | 247,400 | 5.68 | Institutional | Athletic fields for High School. |
| 42 | IV-58 | | | Open Space | Included in parcel 36 |
| 43X | IV-58 | 3,300 | .08 | Housing | Part of back yards and one garage structure will be taken for transit purposes. If possible, some adjacent land should be made available to offset the reduction. Parts of parcels 42 and 44 could be transferred. |
| 44 | IV-58 | | | Housing | Included in parcel 45. Structure to be sold for residential rehabilitation. Bishop Street can be closed and some of the land used to enlarge the rear and side yards. |
| 45 | IV-58 | 44,000 | 1.01 | Housing or open space | Includes parcel 44. Large frame dwelling to be sold off separately with about 10,000 feet of land. Parcel was apparently quarried or excavated at one time, then filled. Subsoil conditions may prevent development except as open space. |
| 46 | IV-58 | 6,000 | .14 | Retail or housing | Close to Green Street Station. Could combine retail with housing above. |
| 48T | IV-58 | GREEN | STREET | STATION | Approximately 2,400 square feet of small scale convenience retail incorporated in station design. |
| 48a | IV-58 | 5,400 | .12 | Open space | Deck over tracks links Johnson Playground and parcel 52 with parcel 53 on east side of tracks. |
| 49X | IV-58 | 27,800 | .64 | Retail or commercial | Building at south end of site could remain. |

Fig. VII-7 Parcel Descriptions-Jamaica Plain FH-6 (Continued)

| PARCEL NO. | DWG. NO. | AREA SQ. FT. | AREA ACRES | LAND USES | COMMENTS |
|---|---|---|---|---|---|
| 52 | IV-58 | 97,000 | 2.23 | Open space | Connects Johnson Playground to open network. |
| 53 | IV-58 | 74,100 | 1.70 | Open space or manufacturing | Ninety foot width could accommodate some active open space uses. Noise environment limits development opportunities to manufacturing. |
| 54 | IV-58 | 146,900 | 3.37 | Open space or manufacturing | 100 foot width could accommodate some active open space uses. Noise environment limits development opportunities to manufacturing. |
| 55 | IV-58 | 8,400 | .19 | Housing | Lot for a one to three family house. |
| 56 | IV-59 | 91,500 | 2.10 | Open space | Suitable for medium scale playfields. |
| 56a | IV-59 | 14,600 | .34 | Open space | Parcel created by realignment of Lamartine Street. |
| 57 | IV-59 | 24,600 | .56 | Open space or retail and housing | Could combine with parcel 57X. An open space linkage should be maintained at the west side of the parcel along the tracks. Mixed retail and housing recommended. |
| 57X | IV-59 | 7,731 | ,18 | Open space or retail and housing | Should be combined with parcel 57 if possible. |
| 58 | IV-59 | 12,480 | .29 | Open space or housing - related | Could be incorporated in open space system or could be sold to abutters in expand yards. |
| 59 | IV-59 | B O Y L S | T O N | S T R E E T S T A T I O N | Approximately 2,400 sq. feet of small scale convenience retail incorporated in station design. |
| 60X | IV-59 | 21,697 | .50 | Retail or housing | Could combine retail and housing. Should be filled to new street level. |
| 61a | IV-59 | 4,550 | .10 | Retail | Small size limits development to single story retail. Eventually this entire block might be assembled for a more coordinated mixed-use development. |
| 61b | IV-59 | 4,413 | .10 | Housing | Lamartine Street is raised substantially. Houses could be raised and land filled in. Alternate solution would move Lamartine Street closer to tracks with a slope down to the houses at their present level. |
| 62X | IV-59 | 30,879 | .71 | Housing, institutional or commercial | Suitable for apartment, elderly housing, nursing home or commercial. |
| 63 | IV-59 | 48,200 | 1.11 | Open space | Ninety foot width permits small to medium scale active open space uses. |

Fig. VII-7 Parcel Descriptions-Jamaica Plain FH-6 (Continued)

| PARCEL NO. | DWG. NO. | AREA SQ. FT. | AREA ACRES | LAND USES | COMMENTS |
|---|---|---|---|---|---|
| 64 | IV-59 | 55,000 | 1.26 | Open space | Maintain as open space. Stony Brook conduit prohibits construction. |
| 64a | IV-59 | 7,450 | .17 | Open space | Fill to new street grade. Provides a linkage between church and station area. |
| 65 | IV-59 | 14,202 | .33 | Housing or commercial | Should have same treatment as parcel 66. Potential early development site. |
| 65a | IV-59 | 7,983 | .18 | Housing | Could be combined with parcel 65X after filling to new street level. |
| 65X | IV-59 | 7,197 | .17 | Housing | Could be combined with parcel 65a. |
| 66 | IV-59 | 48,117 | 1.10 | Housing or commercial | Parking could occur on parcel 67 to permit better quality development here. Potential early development site. |
| 67 | IV-59 | 74,100 | 1.70 | Open space or housing | Without decking over tracks the noise environment and shallowness of the site prohibit development. Housing could not occur until decking over tracks is feasible. Slope down to track level limits usefulness of open space except as visual amenity. |
| 68 | IV-59 | 52,800 | 1.21 | Open space or housing | Open space linkage moves entirely to East side of tracks here to take advantage of open space around 125 Amory elderly housing. When decking over tracks is feasible, parcels 65 through 74X plus the deck area could be combined to make a mixed use development parcel of approximately 13.8 acres. |
| 69 | IV-59 | 58,800 | 1.27 | Open space, commercial, or manufacturing | Poor vehicular access discourages development. Combine with parcels 70X and 71. |
| 70X | IV-60 | 38,130 | .88 | Commercial or manufacturing | Could continue in present use as Cappy's Tow Lot. Could be developed for a higher grade of commercial use or could be combined with parcel 71 for a mixed use development. |
| 71 | IV-60 | 142,900 | 3.28 | Mixed retail and commercial | Development must allow for pedestrian walk and bikeway to connect from parcel 68 past parcel 69 and through to an appropriate point on Centre Street. |
| 73X | IV-60 | 11,867 | .27 | Housing or commercial | Should follow development pattern set by parcels 65,66 and 67. |
| 74 | IV-60 | 14,177 | .33 | Retail and housing | Close to Jackson Square Station. Good location for convenience retail. |

Fig. VII-7 Parcel Descriptions-Jamaica Plain FH-6 (Continued)

| PARCEL NO. | DWG. NO. | AREA SQ. FT. | AREA ACRES | LAND USES | COMMENTS |
|---|---|---|---|---|---|
| 75X | IV-60 | 249,562 | 5.73 | Mixed uses: manufacturing, public facilities, open space | Site of Plant Shoe Factory which burned February 1, 1976. |
| Total | | 4,010,780 | 92,07 | | |
| Total in Corridor | | 2,199,350 | 50.49 | | |
| Total Adjacent | | 1,811,430 | 41.58 | | |

Fig. VII-8 Parcel Descriptions-Roxbury FH-1

| PARCEL NO. | DWG. NO. | AREA SQ. FT. | AREA ACRES | LAND USES | COMMENTS |
|---|---|---|---|---|---|
| 16 | IV-26 | | | | Parcel does not exist in this alternative |
| 17 | IV-26 | 56,000 | 1.29 | Open space | Expansion for adjacent Carter Playground. |
| 17X | IV-26 | 191,000 | 4.40 | Ancillary uses: Transit/Rail Station | Private Ownership |
| T | IV-76 | R U G G L | E S/N O R | T H E A S T E R N S T A T I O N | Air-rights over station; joint development with parcel 18, and Northeastern University. |
| 18 | IV-26 | 131,500 | 3.02 | Retail, hotel, office, institutional, community facility | Major development location adjacent to Station, Northeastern University, and a concentration of new and existing housing. |
| 18a | IV-26 | 15,000 | 0.34 | Open space reserve for future development | Adjacent to St. Cyprian's Church |
| 18b | IV-26 | 122,000 | 2.80 | Retail, office, housing, community facility | Large development parcel having extensive street frontage |
| 19 | IV-26 | 26,000 | 0.60 | Open space | Combine with adjacent open space deck. |
| Deck | IV-26 | | | Open space | Over tracks: area = 102,000SF or 2.34 acres |
| 20 | IV-26 | 73,500 | 1.69 | Retail, housing: community, facility, open space | Adjacent to open space deck |
| 21 | IV-25 | 29,000 | 0.67 | Open Space | Narrow strip (average depth = 50 feet) |
| 22 | IV-25 | 172,500 | 3.96 | Auto oriented commercial, open space | Long, tapering parcel |
| 22a | IV-25 | 33,000 | 0.76 | Auto oriented commercial | Excellent vehicular access |
| 22b | IV-25 | 70,000 | 1.61 | Institutional | Campus High School Occupational Resource Center Facilities and Open Space |
| 23 | IV-25 | 7000 | 0.16 | Open space | Small parcel |
| 24 | IV-25 | 107,500 | 2.47 | Institutional | Proposed Roxbury Community College (contains "Third Nail" bldg.) |
| 25 | IV-25 | 13,000 | 0.30 | Manufacturing housing | Small parcel; develop with parcel 25X |

# PARCEL DESCRIPTIONS
# ROXBURY
# FIGURE VII-8 TO VII-18

Fig. VII-8 Parcel Descriptions-Roxbury FH-1 (Continued)

| PARCEL NO. | DWG. NO. | AREA SQ. FT. | AREA ACRES | LAND USES | COMMENTS |
|---|---|---|---|---|---|
| 25X | IV-25 | 66,000 | 1.52 | Manufacturing, Housing | Private Ownership; Area combined with parcel 25 = 1.82 acres |
| T | IV-78 | ROXBURY CROSSING STATION | | | Retail use within station |
| 25a | IV-25 | 4500 | 0.10 | Ancillary use Transit Station | Small parcel |
| 26 | IV-25 | 98,000 | 2.25 | Institutional | Proposed Roxbury Community College develop with parcel 26X |
| 26X | IV-25 | 102,000 | 2.34 | Institutional | Private ownership<br>Area combined with parcel 26 = 4.59 acres |
| 27 | IV-24 | 206,000 | 4.73 | Auto oriented commercial, open space; manufacturing, institutional | The proposed Roxbury Community College could have access to this parcel via bridges over Columbus Avenue. |
| 28 | IV-24 | 109,000 | 2.50 | Institutional | Proposed Roxbury Community College |
| 29 | IV-24 | 48,000 | 1.10 | Open space | Narrow parcel (average depth = 75 ft.) |
| 30 | IV-24 | 40,500 | 0.93 | Institutional | Proposed Roxbury Community College |
| 31 | IV-24 | 25,000 | 0.57 | Manufacturing | Expansion for adjacent manufacturing uses. |
| 32 | IV-24 | 73,000 | 1.68 | Institutional | Proposed Roxbury Community College |
| T | IV-82 | JACKSON SQUARE STATION | | | Open space on air-rights over station; retail use within station |
| Deck | IV-24 | | | Open space | Over station and tracks: Area = 55,000 SF/1.26 acres |
| 33 | IV-24 | | | | Bus loop in this 'alternative' |
| 34 | IV-24 | 31,500 | 0.72 | Retail, housing, community facility, alt: open space | Major development parcel when developed with Parcel 34X |
| 34X | IV-24 | 223,500 | 5.13 | Retail, housing, community facility, alt: open space | Private ownership and Roxbury Yard - Boston Public Works Dept.:<br>Area combined with parcel 23 = 5.85 acres. |
| 35 | IV-24 | 32,500 | 0.75 | Auto oriented commercial | Excellent vehicular access |
| TOTAL | | 2,077,500 | 47.69 | | 3.6 acres decked area in this alternative (not included in total) |
| INSIDE CORRIDOR | | 1,495,000 | 34.32 | | |
| OUTSIDE CORRIDOR | | 582,500 | 13.37 | | |

Fig. VII-9 Parcel Descriptions-Roxbury FH-2

| PARCEL NO. | DWG. NO. | AREA SQ. FT. | AREA ACRES | LAND USES | COMMENTS |
|---|---|---|---|---|---|
| 16 | IV-33 | 29,000 | 0.67 | Open space; Community facility | Adjacent to Whittier Street Housing; develop with parcel 16X |
| 16X | IV-33 | 54,000 | 1.24 | Open space; Community facility | In segment 1 Arterial Street; Area combined with parcel 16 = 1.91 acres |
| 17 | IV-33 | 56,000 | 1.29 | Open space | Expansion for adjacent Carter Playground |
| 17X | IV-33 | 191,000 | 4.40 | Ancillary uses Transit/Rail Station | Private ownership |
| T | IV-76 | RUGGLES/NORTHEASTERN STATION | | | Air rights over station; joint development with parcel 18 and Northeastern University; retail uses within station |
| 18 | IV-33 | 255,000 | 5.58 | Retail, hotel, office; Community facility, institutional, housing | Major development location adjacent to station, Northeastern University, and a concentration of new and existing housing. |
| 18a | IV-33 | 15,000 | 0.34 | Open space reserve for future development | Adjacent to St. Cyprian's Church |
| 19 | IV-33 | 26,000 | 0.60 | Open space | Combine with Adjacent Open Space Deck |
| Deck | IV-33 | | | Open space | Over tracks: area = 102,000 SF/2.34 acres |
| 20 | IV-33 | 92,000 | 2.11 | Retail, housing, community facility, open space | Adjacent to Open Space Deck |
| 21 | IV-32 | 18,500 | 0.42 | Open space | Narrow strip (depth less than 50 feet) |
| 22 | IV-32 | 297,000 | 6.82 | Institutional, Open space | Campus High School and Occupational Resource Center Facilities and Open Space |
| 23 | IV-32 | 8000 | 0.18 | Open space | Narrow strip (depth less than 50 feet) |
| 24 | IV-32 | 66,000 | 1.52 | Institutional | Proposed Roxbury Community College (contains "Third Nail" Building) |
| 25 | IV-32 | 13,000 | 0.30 | Manufacturing, Housing | Small parcel; develop with parcel 25X |
| 25X | IV-32 | 66,000 | 1.52 | Manufacturing, Housing | Private ownership; area combined with parcel 25 = 1.82 acres |
| T | IV-78 | ROXBURY CROSSING STATION | | | Retail use within station |
| 25a | IV-32 | 4500 | 0.10 | Ancillary use Transit Station | Small parcel |
| 26 | IV-32 | 167,000 | 3.83 | Institutional | Proposed Roxbury Community College; develop with parcel 26X |

Fig. VII-9 Parcel Descriptions-Roxbury FH-2 (Continued)

| PARCEL NO. | DWG. NO. | AREA SQ. FT. | AREA ACRES | LAND USES | COMMENTS |
|---|---|---|---|---|---|
| 26X | IV-32 | 102,000 | 2.34 | Institutional | Private ownership; proposed Roxbury Community College; area combined with Parcel 26 = 6.17 acres. |
| 27 | IV-31 | 27,000 | 0.62 | Open space | Narrow strip (depth less than 50 feet) |
| 28 | IV-31 | 120,500 | 2.77 | Institutional | Proposed Roxbury Community College |
| 29 | IV-31 | 15,000 | 0.34 | Open space | Narrow strip (depth less than 50 feet) |
| 30 | IV-31 | 40,500 | 0.93 | Institutional | Proposed Roxbury Community College |
| 31 | IV-31 | 25,000 | 0.57 | Manufacturing | Expansion for adjacent manufacturing uses |
| 32 | IV-31 | 58,000 | 1.33 | Institutional | Proposed Roxbury Community College |
| T | IV-80 | JACKSON SQUARE STATION | | | Open space on air-rights over station; Retail use within station |
| Deck | IV-31 | | | Open space | Over station and tracks: Area = 55,000 SF/1.26 acres |
| 33 | IV-31 | | | | Within station construction in the alternative |
| 34 | IV-31 | 125,000 | 2.87 | Retail, housing, community facility, alt: open space | Major development parcel when developed with Parcel 34X |
| 34X | IV-31 | 223,500 | 5.13 | Retail, housing, community facility, alt: open space | Private ownership and Roxbury Yard-Boston Public Works: Area combined with parcel 34 = 8 acres. |
| 35 | IV-31 | | | | Within parcel 34 in this Alternative |
| TOTALS | | 2,094,500 | 48.08 | | 3.6 acres decked area in this alternative (not included in totals) |
| TOTAL IN CORRIDOR | | 1,458,000 | 33.47 | | |
| TOTAL ADJACENT | | 636,500 | 14.61 | | |

Fig. VII-10 Parcel Descriptions-Roxbury FH-2b

| PARCEL NO. | DWG. NO. | AREA SQ. FT. | AREA ACRES | LAND USES | COMMENTS |
|---|---|---|---|---|---|
| T | IV-82 | JACKSON SQUARE STATION | | | Open space on air-rights over station; retail use within station. |
| Deck | IV-31a | | | Open space | Over station and tracks: Area = 55,000 SF or 1.26 acres |
| 33 | IV-31a | | | | Within Parcel 35 in this Alternative |
| 34 | IV-31a | 54,500 | 1.25 | Retail, housing, community facility, alt: open space | Major development parcel when combined with parcel 34X |
| 34X | IV-31a | 223,500 | 5.13 | Retail, housing, community facility, alt: open space | Private ownership and Roxbury Yard - Boston Public Works: Area combined with parcel 34 = 6.38 acres |
| 35 | IV-31a | 62,000 | 1.42 | Retail, open space, community facility | Can be linked directly to housing |
| TOTAL | | 2,086,000 | 47.89 | | 3.6 acres decked area in this alternative (not included in totals) |
| TOTAL IN CORRIDOR | | 1,449,500 | 33.28 | | |
| TOTAL ADJACENT | | 636,500 | 14.63 | | |

Note: Alternative FH-2b is identical to Alternative FH-2 from parcel 16 through parcel 32. Alternative FH-2b aligns Arterial Street into Columbus Avenue at Jackson Square.

Fig. VII-11 Parcel Descriptions-Roxbury FH-2c

| PARCEL NO. | DWG. NO. | AREA SQ. FT. | AREA ACRES | LAND USES | COMMENTS |
|---|---|---|---|---|---|
| T | IV-80 | JACKSON SQUARE STATION | | | Open space on air-rights over station; retail use within station |
| Deck | IV-45a | | | Open space | Over station and tracks: Area = 55,000 SF or 1.26 acres |
| 33 | IV-45a | | | | Within station construction in this alternative |
| 34 | IV-45a | 117,500 | 2.70 | Retail, housing, community facility, alt: open space | Major development parcel when combined with parcel 34X |
| 34X | IV-45a | 223,500 | 5.13 | Retail, housing, community facility, alt: open space | Private ownership and Roxbury Yard: Boston Public Works: Area combined with parcel 34 = 7.83 acres |
| 35 | IV-45a | 23,000 | 0.53 | Open space | Irregularly shaped parcel |
| TOTALS | | 2,110,000 | 48.44 | | 3.6 acres decked area in this alternative (not included in totals) |
| TOTAL IN CORRIDOR | | 1,473,500 | 33.83 | | |
| TOTAL ADJACENT | | 636,500 | 14.61 | | |

* Note: Alternative FH-2c is identical to Alternative FH-2 from parcel 16 through parcel 32. Alternative FH-2c terminates Arterial Street at Jackson Square perpendicular to Centre Street.

Fig. VII-12 Parcel Descriptions-Roxbury FH-3

| PARCEL NO. | DWG. NO. | AREA SQ. FT. | AREA ACRES | LAND USES | COMMENTS |
|---|---|---|---|---|---|
| 16 | IV-40 | | | | Parcel does not exist in this alternative |
| 17 | IV-40 | 56,000 | 1.29 | Open space | Expansion for adjacent Carter Playground. |
| 17X | IV-40 | 191,000 | 4.40 | Ancillary uses: Transit/Rail Station | Private Ownership |
| T | IV-75 | R U G G L | E S/N O R | T H E A S T E R N S T A T I O N | Retail uses within station |
| 18 | IV-40 | 131,500 | 3.02 | Retail, hotel, office, institutional, community facility | Major development location adjacent to Station, Northeastern University, and a concentration of new and existing housing. |
| 18a | IV-40 | 15,000 | 0.34 | Open space reserve for future development | Adjacent to St. Cyprian's Church |
| 18b | IV-40 | 122,000 | 2.80 | Retail, office, housing, community facility | Large development parcel having extensive street frontage. |
| 19 | IV-40 | 26,000 | 0.60 | Open space | Expansion for Mission Hill Extension |
| No Deck | IV-40 | | | | No deck possible in this Alternative |
| 20 | IV-40 | 73,500 | 1.69 | Retail, community facility, open space | Adjacent to Embankment |
| 21 | IV-39 | 29,000 | 0.67 | Open Space | Narrow strip (average depth = 50 feet) |
| 22 | IV-39 | 172,500 | 3.96 | Auto oriented commercial, open space | Long, tapering parcel |
| 22a | IV-39 | 33,000 | 0.76 | Auto oriented commercial | Excellent vehicular access |
| 22b | IV-39 | 70,000 | 1.61 | Institutional | Campus High School Occupational Resource Center Facilities and Open Space |
| 23 | IV-39 | 7000 | 0.16 | Open space | Small parcel |
| 24 | IV-39 | 107,500 | 2.47 | Institutional | Proposed Roxbury Community College (contains "Third Nail" bldg.) |
| [illegible] | IV-39 | 13,000 | 0.30 | Manufacturing | Small parcel; develop with parcel 25X |
| 25X | IV-39 | 66,000 | 1.52 | Manufacturing | Private Ownership; Area combined with parcel 25 = 1.82 acres |

Fig. VII-12 Parcel Descriptions-Roxbury FH-3 (Continued)

| PARCEL NO. | DWG. NO. | AREA SQ. FT. | AREA ACRES | LAND USES | COMMENTS |
|---|---|---|---|---|---|
| T | IV-88 | ROXBURY CROSSING STATION | | | Retail use within station |
| 25a | IV-39 | 4500 | 0.10 | Ancillary use Transit Station | Small parcel |
| 26 | IV-39 | 98,000 | 2.25 | Institutional | Proposed Roxbury Community College, develop with parcel 26X |
| 26X | IV-39 | 102,000 | 2.34 | Institutional | Private ownership<br>Area combined with parcel 26 = 4.59 acres |
| 27 | IV-38 | 206,000 | 4.73 | Auto oriented commercial, open space; manufacturing, institutional | The proposed Roxbury Community College could have access to this parcel via bridges over Columbus Avenue. |
| 28 | IV-38 | 109,000 | 2.50 | Institutional | Proposed Roxbury Community College |
| 29 | IV-38 | 48,000 | 1.10 | Open space | Narrow parcel (average depth = 75 ft.) |
| 30 | IV-38 | 40,500 | 0.93 | Institutional | Proposed Roxbury Community College |
| 31 | IV-38 | 25,000 | 0.57 | Manufacturing | Expansion for adjacent manufacturing uses. |
| 32 | IV-38 | 73,000 | 1.68 | Institutional | Proposed Roxbury Community College |
| T | IV-88 | JACKSON SQUARE STATION | | | Retail use within station |
| No Deck | IV-38 | | | | No deck possible in this Alternative |
| 33 | IV-38 | 26,000 | 0.60 | Open space | |
| 34 | IV-38 | 31,500 | 0.72 | Retail, housing, community facility, alt: open space | Major development parcel when developed with Parcel 34X |
| 34X | IV-38 | 223,500 | 5.13 | Retail, housing, community facility, alt: open space | Private ownership and Roxbury Yard - Boston Public Works Dept.:<br>Area combined with parcel 23 = 5.85 acres. |
| 35 | IV-38 | 32,500 | 0.75 | Auto oriented commercial | Excellent vehicular access |
| TOTAL | | 2,103,500 | 48.29 | | No decked area exists in this alternative. |
| INSIDE CORRIDOR | | 1,521,000 | 34.92 | | |
| OUTSIDE CORRIDOR | | 582,500 | 13.37 | | |

Fig. VII-13 Parcel Descriptions-Roxbury FH-4

| PARCEL NO. | DWG. NO. | AREA SQ. FT. | AREA ACRES | LAND USES | COMMENTS |
|---|---|---|---|---|---|
| 16 | IV-47 | 29,000 | 0.67 | Open space; Community facility | Adjacent to Whittier Street Housing; develop with parcel 16X |
| 16X | IV-47 | 54,000 | 1.24 | Open space; Community facility | In segment 1 Arterial Street; Area combined with parcel 16 = 1.91 acres |
| 17 | IV-47 | 56,000 | 1.29 | Open space | Expansion for adjacent Carter Playground |
| 17X | IV-47 | 191,000 | 4.40 | Ancillary uses Transit/Rail Station | Private ownership |
| T | IV-75 | RUGGLES/NORTHEASTERN STATION | | | Retail use within station |
| 18 | IV-47 | 255,000 | 5.58 | Retail, hotel, office; Community facility, institutional, | Major development location adjacent to station, Northeastern University, and a concentration of new and existing housing. |
| 18a | IV-47 | 15,000 | 0.34 | Open space reserve for future development | Adjacent to St. Cyprian's Church |
| 19 | IV-47 | 26,000 | 0.60 | Open space | Expansion for Mission Hill Extension |
| No Deck | IV-47 | | | | No deck possible in this Alternative |
| 20 | IV-47 | 92,000 | 2.11 | Retail, community facility, open space | Adjacent to Embankment |
| 21 | IV-46 | 18,500 | 0.42 | Open space | Narrow strip (depth less than 50 feet) |
| 22 | IV-46 | 297,000 | 6.82 | Institutional, Open space | Campus High School and Occupational Resource Center Facilities and Open Space |
| 23 | IV-46 | 8000 | 0.18 | Open space | Narrow strip (depth less than 50 feet) |
| 24 | IV-46 | 66,000 | 1.52 | Institutional | Proposed Roxbury Community College (contains "Third Nail" Building) |
| 25 | IV-46 | 13,000 | 0.30 | Manufacturing | Small parcel; develop with parcel 25X |
| 25X | IV-46 | 66,000 | 1.52 | Manufacturing | Private ownership; area combined with parcel 25 = 1.82 acres |
| T | IV-88 | ROXBURY CROSSING STATION | | | Retail use within station |
| 26a | IV-46 | 4500 | 0.10 | Ancillary use Transit Station | Small parcel |
| 26 | IV-46 | 167,000 | 3.83 | Institutional | Proposed Roxbury Community College; develop with parcel 26X |

Fig. VII-13 Parcel Descriptions-Roxbury FH-4 (Continued)

| PARCEL NO. | DWG. NO. | AREA SQ. FT. | AREA ACRES | LAND USES | COMMENTS |
|---|---|---|---|---|---|
| 26X | IV-46 | 102,000 | 2.34 | Institutional | Private ownership, proposed Roxbury Community College, area combined with Parcel 26 = 6.17 acres. |
| 27 | IV-45 | 27,000 | 0.62 | Open space | Narrow strip (depth less than 50 feet) |
| 28 | IV-45 | 120,500 | 2.77 | Institutional | Proposed Roxbury Community College |
| 29 | IV-45 | 15,000 | 0.34 | Open space | Narrow strip (depth less than 50 feet) |
| 30 | IV-45 | 40,500 | 0.93 | Institutional | Proposed Roxbury Community College |
| 31 | IV-45 | 25,000 | 0.57 | Manufacturing | Expansion for adjacent manufacturing uses |
| 32 | IV-45 | 58,000 | 1.33 | Institutional | Proposed Roxbury Community College |
| T | IV-88 | JACKSON SQUARE STATION | | | Retail use within station |
| No Deck | IV-45 | | | | No deck possible in this Alternative |
| 33 | IV-45 | 17,500 | 0.40 | Open space | Narrow strip (depth less than 50 feet) |
| 34 | IV-45 | 125,000 | 2.87 | Retail, housing, community facility, alt: open space | Major development parcel when developed with Parcel 34X |
| 34X | IV-45 | 223,500 | 5.13 | Retail, housing, community facility, alt: open space | Private ownership and Roxbury Yard-Boston Public Works: Area combined with parcel 34 = 8 acres. |
| 35 | IV-45 | | | | Within parcel 34 in this Alternative |
| TOTALS | | 2,112,000 | 48.48 | | No decked area exists in this alternative |
| TOTAL IN CORRIDOR | | 1,475,500 | 33.87 | | |
| TOTAL ADJACENT | | 636,500 | 14.61 | | |

Fig. VII-14 Parcel Descriptions-Roxbury FH-4a

| PARCEL NO. | DWG. NO. | AREA SQ. FT. | AREA ACRES | LAND USES | COMMENTS |
|---|---|---|---|---|---|
| I | IV-88 | J A C K S O | N S Q U | A R E S T A T I O N | Retail use within station |
| No Deck | IV-31a | | | | Deck not possible in this Alternative |
| 33 | IV-31a | | | | Within Parcel 35 in this Alternative |
| 34 | IV-31a | 54,500 | 1.25 | Retail, housing, community facility, alt: open space | Major development parcel when combined with parcel 34X |
| [illegible] | IV-31a | 223,500 | 5.13 | Retail, housing, community facility, alt: open space | Private ownership and Roxbury Yard - Boston Public Works: Area combined with parcel 34 = 6.48 acres |
| 35 | IV-31a | 62,000 | 1.42 | Retail, open space | Adjacent to station |
| TOTAL | | 2,086,000 | 47.89 | | No decked area exists in this alternative |
| TOTAL IN CORRIDOR | | 1,449,500 | 33.28 | | |
| TOTAL ADJACENT | | 636,500 | 14.61 | | |

*Note: Alternative Fh-4a is identical to Alternative FH-4 from parcel 16 through parcel 32. Alternative FH-4a aligns Arterial Street into Columbus Avenue at Jackson Square.

Fig. VII-15 Parcel Descriptions-Roxbury FH-4b

| PARCEL NO. | DWG. NO. | AREA SQ. FT. | AREA ACRES | LAND USES | COMMENTS |
|---|---|---|---|---|---|
| [illegible] | IV-88 | JACKSON SQUARE STATION | | | Retail use within station |
| No Deck | IV-45a | | | | Deck not possible in this Alternative |
| 33 | IV-45a | 21,500 | 0.49 | Open space | Narrow strip (depth less than 50 feet) |
| 34 | IV-45a | 117,500 | 2.70 | Retail, housing, community facility, alt: open space | Major development parcel when combined with parcel 34X |
| 34X | IV-45a | 223,500 | 5.13 | Retail, housing, community facility, alt: open space | Private ownership and Roxbury Yard: Boston Public Works: Area combined with parcel 34 = 7.83 acres |
| 35 | | 23,000 | 0.53 | Open space | Irregularly shaped parcel |
| TOTALS | | 2,131,500 | 48.93 | | No decked area exists in this alternative |
| TOTAL IN CORRIDOR | | 1,495,000 | 34.32 | | |
| TOTAL ADJACENT | | 636,500 | 14.61 | | |

*Note: Alternative FH-4b is identical to Alternative FH-4 from parcel 16 through parcel 32. Alternative FH-4b terminates Arterial Street at Jackson Square perpendicular to Centre Street.

Fig. VII-16 Parcel Descriptions - Roxbury FH-5

| PARCEL NO. | DWG. NO. | AREA SQ. FT. | AREA ACRES | LAND USES | COMMENTS |
|---|---|---|---|---|---|
| 16 | IV-55 | 29,000 | 0.67 | Open space: Community facility | Adjacent to Whittier Street Housing: develop with parcel 16X |
| 16X | IV-55 | 54,000 | 1.24 | Open space: Community facility | In segment 1 Arterial Street: Area combined with parcel 16 = 1.91 acres |
| 17 | IV-55 | 56,000 | 1.29 | Open space | Expansion for adjacent Carter Playground |
| 17X | IV-55 | 191,000 | 4.40 | Ancillary uses Transit/Rail Station | Private ownership |
| T | IV-77 | RUGGLES/NORTHEASTERN STATION | | | Air rights over station; joint development with parcel 18 and Northeastern University: retail uses within station. |
| 18 | IV-55 | 255,000 | 5.58 | Retail, hotel, office; Community facility, institutional, housing | Major development location adjacent to station, Northeastern University, and a concentration of new and existing housing. |
| 18a | IV-55 | 15,000 | 0.34 | Open space reserve for future | Adjacent to St. Cyprian's Church |
| 19 | IV-55 | 33,000 | 0.76 | Open space | Combine with Adjacent Open Space Deck |
| Deck | IV-55 | | | Open space | Over tracks: area = 106,000 SF/2.43 acres |
| 20 | IV-55 | 105,000 | 2.41 | Retail, housing, community facility, open space | Adjacent to Open Space Deck |
| 21 | IV-54 | 12,000 | 0.28 | Manufacturing | Narrow strip shlping down to tracks. Abuts adjacent manufacturing. |
| 22 | IV-54 | 267,000 | 6.13 | Institutional, Open Space | Campus High School and Occupational Resource Center Facilities and Open Space |
| 23 | IV-54 | 3,000 | 0.07 | Open space | Narrow strip (depth less than 50 feet) |
| 24 | IV-54 | 54,500 | 1.25 | Institutional | Proposed Roxbury Community College (contains "Third Nail" Building) |
| 25 | IV-54 | 83,500 | 1.92 | Manufacutirng housing, and/or retail | Portion of land slopes down to tracks |
| 25a | IV-54 | 10,000 | 0.23 | Manufacturing Open Space | Small Parcel. |
| 26 | IV-54 | 141,000 | 3.24 | Institutional | Proposed Roxbury Community College, develop with Parcel 26X |

Fig. VII-16 Parcel Descriptions - Roxbury FH-5 (Continued)

| PARCEL NO. | DWG. NO. | AREA SQ. FT. | AREA ACRES | LAND USES | COMMENTS |
|---|---|---|---|---|---|
| 26X | IV-54 | 102,000 | 2.34 | Institutional | Private ownership; proposed Roxbury Community College; area combined with parcel 26 = 5.58 acres |
| T | IV-79 | ROXBURY CROSSING STATION | | | Retail use within station |
| 27 | IV-53 | 8,000 | 0.18 | Open space | Narrow strip |
| 27a | IV-54 | 59,000 | 1.35 | Retail manufacturing | Narrow strip sloping down to tracks. Abuts adjacent manufacturing. Retail at Tremont Street. |
| 27b | IV-53 | 29,000 | 0.67 | Manufacturing | Narrow stip. Expansion for adjacent manufacturing. |
| 28 | IV-53 | 114,000 | 2.62 | Institutional | Proposed Roxbury Community College |
| 29 | IV-53 | 6,000 | 0.14 | Open space | Narrow strip |
| 30 | IV-53 | 36,000 | 0.83 | Institutional | Proposed Roxbury Community College |
| 31 | IV-53 | 40,000 | 0.92 | Manufacturing | Expansion for adjacent manufacturing uses |
| 32 | IV-53 | 38,000 | 0.87 | Institutional | Proposed Roxbury Community College |
| 32a | IV-53 | 7,000 | 0.16 | Retail,housing, open space | Small parcel, may be sold to abuttors |
| T | IV-81 | JACKSON SQUARE STATION | | | Open space on air-rights over station; Retail use within station |
| Deck | IV-53 | | | Open space | Over station and tracks: Area = 55,000 SF/1.26 acres |
| 33 | IV-53 | | | | Within station construction in the alternative |
| 34 | IV-53 | 119,000 | 2.73 | Retail, housing, community facility, alt: open space | Major development parcel when developed with Parcel 34X |
| 34X | IV-53 | 219,000 | 5.03 | Retail, housing, community facility, alt: open space | Private ownership and Roxbury Yard-Boston Public Works: Area combined with parcel 34 = 7.76 acres. |
| 35 | IV-53 | | | | Within parcel 34 in this Alternative |

Fig. VII-16 Parcel Descriptions - Roxbury FH-5 (Continued)

| PARCEL NO. | DWG. NO. | AREA SQ. FT. | AREA ACRES | LAND USES | COMMENTS |
|---|---|---|---|---|---|
| Totals | | 2,086,000 | 47.65 | | 3.6 acres decked area in this alternative (not included in totals) |
| Total in Corridor | | 1,520,000 | 34.64 | | |
| Total Adjacent | | 566,000 | 13.01 | | |

Fig. VII-17 Parcel Descriptions-Roxbury FH-6

| PARCEL NO. | DWG. NO. | AREA SQ. FT. | AREA ACRES | LAND USES | COMMENTS |
|---|---|---|---|---|---|
| T | IV-83 | JACKSON SQUARE STATION | | | Open space on air-rights over station: Retail use within station |
| Deck | IV-60 | | | Open space | Over station and tracks: Area = 55,000 SF/1.26 acres |
| 33 | IV-60 | | | | Within station construction in the alternative |
| 34 | IV-60 | 46,000 | 1.05 | Retail, housing, community facility, alt: open space | Major development parcel when developed with Parcel 34X |
| 34X | IV-60 | 219,000 | 5.03 | Retail, housing, community facility, alt: open space | Private ownership and Roxbury Yard-Boston Public Works: Area combined with parcel 34 = 6.08 acres. |
| 35 | IV-60 | 73,000 | 1.68 | Retail, open space, community facility | |
| Totals | | 2,086,000 | 47.65 | | 3.6 acres decked area in this alternative (not included in totals) |
| Total in Corridor | | 1,520,000 | 34.64 | | |
| Total Adjacent | | 566,000 | 13.01 | | |

Fig. VII-18 Parcel Descriptions-Roxbury FH-6a

| PARCEL NO. | DWG. NO. | AREA SQ. FT. | AREA ACRES | LAND USES | COMMENTS |
|---|---|---|---|---|---|

Note: Parcels in Alternative FH-6a are identical to parcels in Alternative FH-5 (Fig. VII-16)

The arterial street in Alternative FH-6a terminates at Jackson Square perpendicular to Centre Street.

PARCEL DESCRIPTIONS
SOUTH END
FIGURE VII-19 TO VII-20

Fig. VII-19 Parcel Descriptions-South End SC-1

| PARCEL NO. | DWG. NO. | AREA SQ. FT. | AREA ACRES | LAND USES | COMMENTS |
|---|---|---|---|---|---|
| T | IV-74 | MASSACHUSETTS AVENUE STATION | | | Retail use within station |
| 1 | IV-63 | 3,000 | 0.07 | Residential, retail office, and/or open space | Joint Development Parcel |
| 2 | IV-63 | 7,600 | 0.17 | Residential, retail office, and/or open space | Joint Development Parcel |
| T | IV-70&71 | BACK BAY STATION | | | Retail uses within station; office space on air-rights over station |
| 3 | IV-64 | 3,500 | 0.08 | Residential, retail and/or open space | Parcel could be developed with adjacent parking lot. Landscaped and fenced. |
| 4 | IV-64 | 2,100 | 0.05 | Open space | May be sold to abuttor(s) . Landscaped and fenced |
| 5 | IV-64 | 2,000 | 0.04 | Open space | May be sold to abuttor(s). Landscaped and fenced |
| 6 | IV-65 | 4,000 | 0.09 | Residential, retail, and/or open space | |
| 7 | IV-65 | 900 | 0.02 | Commercial | Possible resale to present owner |

Fig. VII-20 Parcel Descriptions-South End SC-2

| PARCEL NO. | DWG. NO. | AREA SQ. FT. | AREA ACRES | LAND USES | COMMENTS |
|---|---|---|---|---|---|
| T | IV-74 | MASSACHUSETTS AVENUE STATION | | | Retail use within station |
| 1 | IV-66 | 3,000 | 0.07 | Residential, retail,office and/or open space | Joint Development Parcel |
| 2 | IV-66 | 7,600 | 0.17 | Residential, retail, office and/or open space | Joint Development Parcel |
| T | IV-70&71 | BACK BAY STATION | | | Retail uses within station; office space on air-rights over station |
| 3 | IV-67 | 3,500 | 0.08 | Residential, retail, office and/or open space | Parcel could be developed with adjacent parking lot |

### 7.4.5 Development Potential

Section 7.4.3 describes physical characteristics of the Corridor development parcels including existing land use, existing zoning, and topography, and then describes the uses which are being proposed for the parcels, under the various alternatives. Other physical properties such as accessibility to vehicles and pedestrians, and size and shape of the parcel were also considered in the determination of land uses. These land uses were determined not only from consideration of the physical characteristics outlined above, but, in addition, compatibility of the uses with adjacent neighborhoods was confirmed through public review.

Section 7.4.4 then lists each parcel and its proposed land use as well as miscellaneous comments.

Section 7.4.5 quantifies the development potential of the uses assigned to parcels in the Corridor. Uses are described in terms of areas of manufacturing space and ground floor retail space, dwelling units, or acres of open space, etc. Parking has been considered, based on the requirements of the zoning code of the City of Boston.

The figures developed in this section are a first cut at quantifying development in the Corridor on a parcel-by-parcel basis. The figures are based on estimates of the market viability of each use and, as such, are clearly subject to more detailed analysis.

Additional reports in the Corridor can utilize the land use information established in Section 7.4 and then further analyze each parcel for development potential in the context of marketability and financial feasibility. Such analysis would consider market information, land price and other cost data, and financing analysis to establish feasibility of the parcels for various development programs.

#### 7.4.5.1 Development Potential - Jamaica Plain

Housing development potential is similar for all alternatives. The major variable is the change in environmental quality caused by the choice of transit and street alternatives. This will directly affect the likelihood, pace and quality of residential construction.

Hotel/motel, office, manufacturing, and institutional uses are not directly affected by the choice of alternatives.

Retail and service retail uses are similar for the Depressed and Modified Depressed alternatives with the arterial street reducing retail physical potential at Jackson Square by about 10,000 square feet. The Embanked alternatives reduce retail potential by about 40,000 square feet, principally through reductions within the Forest Hills station complex.

Auto-oriented commercial is something of a catchall category encompassing a wide variety of small enterprises which require vehicular access and visibility. It does not depend on walk-in and local neighborhood patronage as does the retail category, and it is not characterized by intensive fabrication and assembly processes as is the manufacturing category. Representative auto-oriented commercial uses might be: Drive-in bank branch, dry cleaner, lumberyard, auto parts store, restaurant, new car dealership, appliance repair shop, diner, green house and garden supply center, etc. In many cases, certain uses are not environmentally or visually compatible with the surroundings; however, this is best judged on a case-by-case basis, and can be controled by proper restrictions of sale of open land.

In analyzing much of the land in Jamaica Plain, it becomes apparent that the most reasonable new development would be as some form of auto-oriented commercial. A more precise identification of future use must await later stages of the project.

The arterial alternatives show about a 25% reduction in the amount of land available for auto-oriented commercial development, but an increase in auto exposure creating a higher market. If each establishment needs about 20,000 square feet, this represents about 23 establishments under arterial alternatives compared with 30 establishments under alternatives with no arterial.

The open space category shows a fairly uniform total area for all alternatives. A major greenbelt is included in all alternatives. For the arterial alternatives a portion of the greenbelt is a strip running between the curb and an arbitrary line a minimum of some fifteen feet from the curb. In certain zones where there is a nearby boundary or barrier, additional land is included as greenbelt since the land involved is not worth discussing as a separate parcel. "Greenbelt" land would accomodate sidewalks, bikepaths, a regional trail, grass, plantings, occasional benches and street furniture, etc. It is not intended for open space activities such as playgrounds, picnic areas, etc. because of its narrow dimension and proximity to street traffic though it serves to connect such activities in a continuous network. Alternative 2 has 32.8% of its open space in the greenbelt category and Depressed and Modified Depressed with Arterial have about 33% of their open space in the greenbelt category, while Embanked with Arterial has about 41% of its open space in the greenbelt system, since the embankment eliminates other uses. The No Arterial alternatives also have some small greenbelt areas; however, these would have to be augmented by portions of their active open spaces to accomodate the bikepaths, sidewalks, trails, etc. otherwise accomodated within the greenbelt.

The embanked alternatives FH-3 and FH-4, while showing comparable open space areas, will have significantly reduced utility of that open space because of the embankment slopes.

The Modified Depressed alternatives have very large streches of auto-free pedestrian and bike way trails since these can pass under cross streets alongside the rail facility.

Community facilities have not been allocated separate land areas. It is assumed that they occur within designated open spaces or within structures built for other uses.

Land sold to abutters is generally narrow and/or inaccessible. The abutters are generally residential or industrial in nature. It is assumed that they will make use of the land; however, no significant new development is likely to result. There are no major differences between alternatives except to say that Depressed and Modified Depressed with Arterial takes a substantial portion of such land and uses it for the arterial street, avoiding reductions in other land use categories.

Generally speaking, the major rail and street alternatives have some small impact on the total aggregate physical development potential in Jamaica Plain. Rail and street alternatives will have significant differences in the way they affect individual parcels and local neighborhood conditions. They will also have a major role in determining how rapidly development can be achieved and what quality of development can occur, particularly in proximity to the transportation facility. The Depressed and Modified Depressed alternatives will be conducive to earlier and higher quality development of all sorts. The Arterial Street alternatives FH-2 and FH-4 will improve the market for retail and commercial uses as well as for initial sales and rentals of housing, but may have negative consequences for housing on a longer-term basis unless that housing is carefully sited and designed.

### 7.4.5.2 Development Potential - Roxbury

The summary of use quantities by Alternative in Section 7.4.5 shows some very evident changes in land use in the Roxbury section when comparing the "build street" options (FH-2, FH-4, FH-5, and FH-6) to the "no-build street" in Roxbury options (FH-1 and FH-3).

a) When parcel 18 remains split by Columbus Avenue, assumptions have been made that the hotel remains adjacent to the transit/rail station and that retail is a stronger use than the office space on parcel 18b. For these reasons and the difficulty of sharing parking on the split site, the office space shown in the "build street" options is not shown in the "no build" street options.

b) Approximately 250,000 S.F. (5.75 acres) of institutional space is not readily available for use in the "no-build street" (FH-1 and FH-3), that is available in FH-2 and FH-4. Most of this land appears in the "build street" alternatives as expansion for the Campus High School complex (297,000 S.F.). In the no-build street alternatives only 70,000 S.F. of the above total is available; therefore, 227,000 S.F. (5.2 acres) is lost to Campus High School under the "no-build street" alternatives. Roxbury Community College has a land area of 452,000 S.F. in the Corridor under the "build street" alternatives (FH-2 and FH-4), and 432,000 under the "no-build street" alternatives. This is only a difference of 20,000 S.F. or approximately 1/2 acre; however, the parcel configuration in the "build street" situation is far more regular with all parcels having similar depths.

In the Modified Depressed Alternatives Campus High School has an expansion area of 267,000 S.F. which is 30,000 S.F. (0.7 acre) less than in the fully depressed alternatives. The Roxbury Community College has combined Corridor parcels totaling 383,500 S.F. as shown in the drawings of the Modified Depressed Alternatives as opposed to 452,000 in the fully depressed schemes; this is a difference of 68,500 S.F. or slightly over 1-1/2 acres. This difference is due to an improvement in railroad alignment rather than because of any change inherent in alternatives. It would occur if such an improvement were introduced in the fully depressed alternative, the reverse is also true.

c) The land area that has been lost to these institutional uses is mainly found in long narrow parcels (parcels 22 and 27) in the "no-build street" alternatives. These parcels have been designated for auto-oriented commercial uses (e.g. dry cleaner, auto parts store, fast food, green house and garden supply, drive-in bank, other drive-in uses, etc.). The lost land area in the Modified Depressed Alternatives is due to the straightening of the track alignment.

d) The parcel 18 area is most affected by the "no-build street" option: parcel 18 is split, allowing less flexibility for mixed development because the possibility of shared parking and direct access to the transit/rail station are eliminated. Parcel 16 is eliminated because Tremont Street remains. Parcel 16 is an open space buffer for the Whittier Street Housing and its size is approximately 30,000 S.F.

The differences in development potential between the depressed and the embanked transit/rail alternatives cannot be determined merely from the summary of area quantities by alternative in Section 7.4.5. Evaluation of individual parcels in each alternative must consider the various factors that affect marketability. Equally as critical are the adverse environmental and physical conditions associated with the embanked alternatives.

a) The hotel/motel, retail and office use categories are numerically constant with reference to depressed or embanked. The critical difference between these alternatives will be most pronounced in the marketability of the various sites. It is obvious that a hotel or office building will be <u>far less marketable</u> when erected adjacent to an elevated and noisier facility than when next to the same transportation elements when they are less obtrusive. These comments also apply to retail locations, although the impacts are not as severe as for office and hotel use. It must be noted that this problem still exists even with the addition of noise walls on the embankment, since decking and air-rights are virtually impossible in the embanked alternatives.

b) Housing is shown as an alternate use on parcels 18, 18b, 20, and 25. Housing could not be a use on parcels 18, 20, and 25 under the embanked alternatives, because of the presence of the elevated facility and its associated noise. The total assumed for the three parcels is 500 to 600 residential units.

c) Open space is shown as an adjunct to decks over the depressed transit/ rail adjacent to the housing at Mission Hill and Bromley Heath. The open space on these decks is not possible or available under the embanked alternatives.

Manufacturing appears as a numerical constant in all alternatives (parcels 25 and 31). These parcels abut existing light manufacturing areas. The Terrace Street manufacturing strip (lying between parcels 25 and 31) is presently experiencing a rapid increase in vacancies and fire damage. The uses and future use of this area must be considered in all alternatives, although the land is outside any government ownership. Manufacturing is shown as an alternate use on parcel 27 in the "no-build street" alternatives.

d) Manufacturing and retail have slightly larger development potential in the Modified Depressed schemes than in other alternatives. This is mainly due to larger parcels to the west of the track alignment both because of the takings required at cross streets and the straightening of the track alignment. For these same reasons, somewhat less land is available on the east side of the alignment resulting in a small reduction of open space of approximately one acre.

e) The relatively small amounts of retail space that would be available in stations at Roxbury Crossing and Jackson Square has not been expressed in the tabulations. The large Joint Development possibility at Ruggles/ Northeastern station appears in the tabulation for parcel 18.

7.4.5.3 Development Potential - South End

Alternatives SC-1 and SC-2 each contain the largest parcel resulting from acquisition near Back Bay Station which is parcel 3. Parcel 3 has the possibility of being developed with the adjacent parking area, whereas parcels 4, 5, 6 and 7 (occurring in alternative SC-1) are small and suited to modest development that should be carefully coordinated and designed for compatibility with residences in the historic district.

Joint Development that could occur at Massachusetts Avenue Station and especially at Back Bay station has far more potential than the other relatively small parcels in the South End.

DEVELOPMENT POTENTIAL
JAMAICA PLAIN
FIGURE VII-21 TO VII-29

SUMMARY
JAMAICA PLAIN

Fig. VII-21

# DEVELOPMENT POTENTIAL

| ALTERNATIVE | HOUSING 1-4 FAMILY (D.U.) | HOUSING MULTI FAMILY (D.U.) | HOTEL/MOTEL (ROOMS) | RETAIL AND SERVICE RETAIL (SF BLDG AREA) | AUTO-ORIENTED COMMERCIAL (SF LAND AREA) | OFFICE (SF BLDG. AREA) | MANUFACTURING (SF BLDG.AREA) | INSTITUTIONAL (SF LAND AREA) | OPEN SPACE (SF LAND AREA) | COMMUNITY FACILITY (VARIOUS UNITS) | SELL TO ABUTTORS (SF LAND AREA) | RESELL AS IS (VARIOUS UNITS) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FH-1 | 106 | 71 | 200 | 149,300 | 604,472 | 20,000 | 104,726 | 1,336,700 | 1,113,762 | varies | 285,251 | 81,684 |
| | | | | | (13.88A) | | | (30.69A) | (25.57A) | | (6.55A) | |
| FH-2 | 109 | 89 | 200 | 139,300 | 467,011 | 20,000 | 104,726 | 1,336,700 | 1,068,762 | varies | 136,792 | 81,684 |
| | | | | | (10.72A) | | | (30.69A) | (24.54A) | | (3.14A) | |
| FH-3 | 108 | 77 | 200 | 106,800 | 594,020 | 20.000 | 104,726 | 1,336,700 | 1,148,362 | varies | 288,786 | 79,444 |
| | | | | | (13.64A) | | | (30.69A) | (26.36A) | | (6.63A) | |
| FH-4 | 106 | 89 | 200 | 101,800 | 460,359 | 20,000 | 104,726 | 1,336,700 | 1,022,962 | varies | 264,751 | 81,684 |
| | | | | | (10.57A) | | | (30.69A) | (23.48A) | | (6.08A) | |
| FH-5 | 138 | 89 | 200 | 148,200 | 452,470 | 20,000 | 104,726 | 1,325,700 | 1,035,892 | varies | 119,771 | 123,526 |
| | | | | | (10.39A) | | | (30.43A) | (23.78A) | | (2.75A) | |
| FH-6 | 120 | 81 | 200 | 154,300 | 496,517 | 20,000 | 104,726 | 1,335,700 | 1,145,692 | varies | 222,771 | 123,526 |
| | | | | | (11.40A) | | | (30.66A) | (26.30A) | | (5.11A) | |

Fig. VII-22

SUBSTITUTE DEVELOPMENT APPROACHES FOR CERTAIN PARCELS - Jamaica Plain*

| Footnote # | Parcel #s Involved | Alternatives Involved | Substitute Development Program | Comments |
|---|---|---|---|---|
| 1 | 2,3,4 | all | 76304 S.F. commercial land | Some current uses inconsistent with zoning and future land use effects of station. |
| 2 | 12 | all | 20 d.u. MF housing; 10,000 S.F. retail; 10,000 S.F. open space | If a direct connection to the Arboretum cannot be arranged, then the southern part of the site could be developed for private uses. |
| 3 | 16X | 3 and 4 with no Orange Line Extension to West Roxbury | 500 to 1000 car parking garage | Parking cannot be accommodated in station area. |
| 4 | 26 | all | open space | Neighborhood play area if housing development proves impossible or undesirable. |
| 5 | 30 | all | sell standing houses - 2 structures; -3 d.u. total | Redraw lot lines to adjust to street realignments and to encompass vacant lots. |
| 6 | 35,36 | 1,3 | 90 d.u. MF housing with open space between housing and tracks | Construction along Call Street would be far enough from tracks to minimize noise impact problems. |
| 7 | 37 | 1.2 | 41,500 S.F. open space or 41,500 S.F. land for housing development | Development should be coordinated with that of parcels 35, 36, 38 and 40X. |
| 8 | 45 | all | open space | If conditions discourage housing development, this could become a useful park especially for young children and elderly. |
| 9 | 53,54 | 1 | 193,000 S.F. land for manufacturing or commercial | May seriously impact existing houses, and Neighborhood House on Amory Street. |
| 10 | 57 | 1 | 3000 S.F. retail plus open space | Small retail near station. |
| 11 | 60X,61x & adjacent | all | slightly over one acre for a mixed retail, commercial, residential development | Proximity of churches and parks reinforces this block as a potential neighborhood nucleus. |

* These substitutes apply to the following sections describing proposed land uses for each parcel. They are presented here first to make sure the reader is aware of the possible substitutions as he reads the material.

Fig. VII - 22 (Continued)

SUBSTITUTE DEVELOPMENT APPROACHES FOR CERTIAN PARCELS

| Footnote # | Parcel #s Involved | Alternatives Involved | Substitute Development Program | Comments |
|---|---|---|---|---|
| 12 | 62X | all | 3/4 acre site for elderly housing, nursing home, or commercial | Could borrow from parcel 63 for parking and open space requirements. |
| 13 | 63 | 2,4 | open space | If satisfactory development cannot be achieved, this should be treated as open space as under alternative 1 and 3. |
| 14 | 65,66,67 and 68 | 1,2 | medium density housing | Only possible with decking over tracks. If joined with parcels 69 through 74X, this could provide for a major mixed-use development of 10 to 12 acres. |

The above table lists a number of substitute development possibilities for certain sites. None of these represents a major change in neighborhood character, but rather suggests a second choice within the constraints imposed by existing surroundings.

Wider ranging development approaches are possible under different policy assumptions such as:

- o Reduce open space and increase amounts of housing, retail and commercial development
- o Rezone for higher housing densities and give other encouragement for denser urban development
- o Encourage manufacturing and commercial development while reducing open space and housing development
- o Create special zones at station areas to encourage higher density mixed-use development
- o Encourage additional new development through development incentives, rezoning, and public acquisition of substandard, non-conforming, and under utilized adjacent real estate

While all of these approaches are theoretically possible, they have not been deeply evaluated in this study because they are not consistent with neighborhood feelings, and because alternative sites are available where such additional development can be accomplished more easily.

The prevailing development objective assumed during this study has been the restoration of the neighborhood to its previous residential character and quality. Emphasis has been placed on continuation of present densities and long term maintainability of the uses proposed.

Notes and symbols:

o Indicates dedication of a portion of the parcel for open space use to accommodate such uses as the Regional Trail, bike path, and a "green belt" concept.

oo Indicates the possibility of providing a community facility as part of the proposed development. This facility could take many forms.

Fig. VII-23

LIST OF PROPERTIES TO BE SOLD AS IS

| Note | Parcel # | Alternatives | Addresses | Description | Comment |
|---|---|---|---|---|---|
| A | 2 | all | | lumberyard<br>houses & land | Alt's. 1, 1b & 2: make adjustments for new street grade before sale. |
| B | 3 | all | | houses and land | Alt's. 1, 1b & 2: make adjustments for new street grade before sale. |
| C | 10 | all | 8 Asticou Road | 2 family house | Sell after Washington Street extension is built. |
| D | 43X | 1b, 2, 4 | 28 Everett<br>30 Everett | 3 family townhouse<br>3 family townhouse | Resell to former owners or others after adjusting grades and lot shapes and providing acoustic and visual treatment. |
| E | 44 | all | 26 Everett | 3 family townhouse | Resell for rehabilitation. |
| F | 45 | all | 22 Everett | 1 or 2 family house | Resell for rehabilitation. |
| G | 7X | 5,6 | 3811 Washington<br>3819 Washington<br>3823 Washington<br>3825 Washington | house<br>retail<br>house<br>house | Resell to former owners or others after adjusting for new street profile. A similar approach could be used for alternatives 1 & 2 also, instead of the full taking described there. |
| H | 61b | 5,6 | 177-179 &<br>181-183<br>Lamartine | 2 family house | Resell to former owners or others after adjusting for new street profile. |
| I | 65a | 5,6 | 90 Mozart St. | house | Resell after relocating structure westward to 88 Mozart Street. |

Alt. FH-1 | NEIGHBORHOOD JAMAICA PLAIN | Fig. VII-24

# DEVELOPMENT POTENTIAL

| PARCEL | AREA (SQ.FT.) | MIXED USE | ALTERNATE | HOUSING 1-4 FAMILY (D.U.) | HOUSING MULTI FAMILY (D.U.) | HOTEL/MOTEL (ROOMS) | RETAIL AND SERVICE RETAIL (SF BLDG AREA) | AUTO-ORIENTED COMMERCIAL (SF LAND AREA) | OFFICE (SF BLDG. AREA) | MANUFACTURING (SF BLDG.AREA) | INSTITUTIONAL (SF LAND AREA) | OPEN SPACE (SF LAND AREA) | COMMUNITY FACILITY (VARIOUS UNITS) | SELL TO ABUTTORS (SF LAND AREA) | RESELL AS IS (VARIOUS UNITS) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 97,500 | | | | | | | 97,500 | | | | | | | |
| 2 | 51,415 | | (1) | | | | | | | | | | | | 51,415(A) |
| 3 | 10,189 | | (1) | | | | | | | | | | | | 10,189(B) |
| 4 | 14,700 | | (1) | | | | | | | | | 14,700 | | | |
| 5 | 54,726 | | | | | | | | | 54,726 | | | | | |
| 6,7, 8 | 38,025 | | | | | | | 38,025 | | | | | oo | | |
| 9 | 99,000 | x | | | | | | 20,000 | | | | | oo | 79,000 | |
| 10 | 2780 | | | | | | | | | | | | | | 2780(C) |
| 11 | 25,700 | x | | | 15 | | 10,000 | | | | | | | | |
| 12 | 40,500 | | (2) | | | | | | | | | 40,500 | oo | | |
| 13 | Station | | | | | | 50,000 | | | | | | | | |
| 14 | Station | | | | | | 18,500 | | | | | | | | |
| 15 | 60,000 | | | | | | | | | | | 60,000 | oo | | |
| 16X | 111,900 | x | (3) | | | 200 | 20,000 | | 20,000 | | | | oo | | |
| 17 | 20,000 | | | | | | | | | | | 20,000 | | | |
| 18 | 40,000 | | | | | | | | | | 40,000 | | oo | | |
| 19X | 740,000 | | | | | | | 20,000 | | | 720,000 | o | | | |
| 20X & 21X | 43,700 | | | | | | | 43,700 | | | | | | | |
| 22 | 25,600 | | | | | | | 25,600 | | | | | | | |

Alt.# FH-1 | NEIGHBORHOOD JAMAICA PLAIN | Fig. VII-24 Continued

# DEVELOPMENT POTENTIAL

| PARCEL | AREA (SQ.FT.) | MIXED USE | ALTERNATE | HOUSING 1-4 FAMILY (D.U.) | HOUSING MULTI FAMILY (D.U.) | HOTEL/MOTEL (ROOMS) | RETAIL AND SERVICE RETAIL (SF BLDG AREA) | AUTO-ORIENTED COMMERCIAL (SF LAND AREA) | OFFICE (SF BLDG. AREA) | MANUFACTURING (SF BLDG.AREA) | INSTITUTIONAL (SF LAND AREA) | OPEN SPACE (SF LAND AREA) | COMMUNITY FACILITY (VARIOUS UNITS) | SELL TO ABUTTORS (SF LAND AREA) | RESELL AS IS (VARIOUS UNITS) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 23 | 111,000 | | | | | | | | | | | | | | |
| 24 | 12,600 | | | | | | | | | | 12,600 | | | 111,000 | |
| 25 | 18,624 | | | 2 | | | | | | | | | | 9624 | |
| 26 | 155,000 | x | (4) | 60 | | | | | | | | 55,000 | oo | | |
| 27X | 29,415 | | | 17 | | | | | | | | | | | |
| 29 | 23,051 | | | 13 | | | | | | | | | | | |
| 30 | 15,821 | | (5) | 8 | | | | | | | | | | | |
| 31 | 3387 | | | | | | | | | | | | | 3387 | |
| 32 | 8386 | | | 3 | | | | | | | | | | | |
| 33 | 4098 | | | 1 | | | | | | | | | | | |
| 34 | 19,760 | | | | | | | | | | | | | 19,760 | |
| 35 | 48,500 | | | | | | | | | | | 48,500 | oo | | |
| 36 | 49,000 | | | | | | | | | | | 49,000 | oo | | |
| 37 | future air rights | | (7) | | | | | | | | | | | | |
| 38 | 50,000 | | | | | | | | | | | o | | 50,000 | |
| 39a & b | 74,000 | | | | | | | | | | | 74,000 | | | |
| 40X | 216,700 | | | | | | | | | | 216,700 | | | | |
| 41X | 247,400 | | | | | | | | | | 247,400 | | | | |

Alt. # FH-1 | NEIGHBORHOOD JAMAICA PLAIN | Fig. VII-24 Continued

## DEVELOPMENT POTENTIAL

| PARCEL | AREA (SQ.FT.) | MIXED USE | ALTERNATE | HOUSING 1-4 FAMILY (D.U.) | HOUSING MULTI FAMILY (D.U.) | HOTEL/MOTEL (ROOMS) | RETAIL AND SERVICE RETAIL (SF BLDG AREA) | AUTO-ORIENTED COMMERCIAL (SF LAND AREA) | OFFICE (SF BLDG. AREA) | MANUFACTURING (SF BLDG.AREA) | INSTITUTIONAL (SF LAND AREA) | OPEN SPACE (SF LAND AREA) | COMMUNITY FACILITY (VARIOUS UNITS) | SELL TO ABUTTORS (SF LAND AREA) | RESELL AS IS (VARIOUS UNITS) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 43X | 3300 | | | | | | | | | | | | | | 3300(D) |
| 44 | 2000 | | | | | | | | | | | | | | 2000(E) |
| 45 | 42,000 | x | (8) | | 18 | | | | | | | o | oo | | 12000(F) |
| 46 | 6000 | x | | 2 | | | 2000 | | | | | | oo | | |
| 48 | Station | | | | | | 2400 | | | | | | | | |
| 49X | 27,800 | x | | | | | 5000 | 17,800 | | | | | oo | | |
| 52 | 97,000 | | | | | | | | | | | 97,000 | oo | | |
| 53 | 110,000 | | (9) | | | | | | | | | 110,000 | oo | | |
| 54 | 83,000 | | (9) | | | | | | | | | 83,000 | oo | | |
| 56 | 151,000 | | | | | | | | | | | 151,000 | oo | | |
| 57 | 51,000 | | (10) | | | | | | | | | 57,000 | oo | | |
| 58X | 12,480 | | | | | | | | | | | | | 12,480 | |
| 59 | Station | | | | | | 2400 | | | | | | | | |
| 60X | 21,697 | | (11) | | 10 | | 5000 | | | | | | | | |
| 61X | 4550 | | (11) | | | | 4000 | | | | | | | | |
| 62X | 30,879 | | (12) | | 18 | | | | | | | | oo | | |
| 63 | 64,500 | | | | | | | | | | | 64,500 | oo | | |
| 64 | 41,000 | | | | | | | | | | | 41,000 | | | |
| 65 | 14,202 | | (14) | | | | | 14,202 | | | | | | | |

Alt. # FH-1 | NEIGHBORHOOD JAMAICA PLAIN | Fig. VII-24 Continued

## DEVELOPMENT POTENTIAL

| PARCEL | AREA (SQ.FT.) | MIXED USE | ALTERNATE | HOUSING 1-4 FAMILY (D.U.) | HOUSING MULTI FAMILY (D.U.) | HOTEL/MOTEL (ROOMS) | RETAIL AND SERVICE RETAIL (SF BLDG AREA) | AUTO-ORIENTED COMMERCIAL (SF LAND AREA) | OFFICE (SF BLDG. AREA) | MANUFACTURING (SF BLDG.AREA) | INSTITUTIONAL (SF LAND AREA) | OPEN SPACE (SF LAND AREA) | COMMUNITY FACILITY (VARIOUS UNITS) | SELL TO ABUTTORS (SF LAND AREA) | RESELL AS IS (VARIOUS UNITS) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 66 | 48,117 | | (14) | | | | | 48,117 | | | | | | | |
| 67 | 92,600 | | (14) | | | | | 92,600 | | | | | | | |
| 68 | 60,500 | | (14) | | | | | | | | | 60,500 | oo | | |
| 69 | 55,500 | | | | | | | 55,500 | | | | o | oo | | |
| 70X | 38,130 | | | | | | | 38,130 | | | | | | | |
| 71 | 100,500 | x | | | | | 15,000 | 70,500 | | | | o | oo | | |
| 72 | 30,931 | x | | | | | 10,000 | 10,931 | | | | | oo | | |
| 73X | 11,867 | | | | | | | 11,867 | | | | | | | |
| 74X | 14,177 | x | | | 10 | | 5000 | | | | | | | | |
| 75X | 249,562 | x | | | | | | | | 50,000 | 100,000 | 49,562 | oo | | |
| Greenbelt | 38,500 | | | | | | | | | | | 38,500 | oo | | |
| | | | | | | | | | | | | | | | |
| Totals | | | | 106 | 71 | 200 | 149,300 | 604,472 | 20,000 | 104,726 | 1,336,700 | 1,113,762 | varies | 285,251 | 81,684 |

ALT.# FH-2 | NEIGHBORHOOD JAMAICA PLAIN | Fig. VII-25

# DEVELOPMENT POTENTIAL

| PARCEL | AREA (SQ.FT.) | MIXED USE | ALTERNATE | HOUSING 1-4 FAMILY (D.U.) | HOUSING MULTI FAMILY (D.U.) | HOTEL/MOTEL (ROOMS) | RETAIL AND SERVICE RETAIL (SF BLDG AREA) | AUTO-ORIENTED COMMERCIAL (SF LAND AREA) | OFFICE (SF BLDG. AREA) | MANUFACTURING (SF BLDG.AREA) | INSTITUTIONAL (SF LAND AREA) | OPEN SPACE (SF LAND AREA) | COMMUNITY FACILITY (VARIOUS UNITS) | SELL TO ABUTTORS (SF LAND AREA) | RESELL AS IS (VARIOUS UNITS) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 97,500 | | | | | | | 97,500 | | | | | | | |
| 2 | 51,415 | | (1) | | | | | | | | | | | | 51,415 (A) |
| 3 | 10,189 | | (1) | | | | | | | | | | | | 10,189 (B) |
| 4 | 14,700 | | (1) | | | | | | | | | 14,700 | | | |
| 5 | 54,726 | | | | | | | | | 54,726 | | | | | |
| 6,7, 8 | 38,025 | | | | | | | 38,025 | | | | | oo | | |
| 9 | 99,000 | x | | | | | | 20,000 | | | | | oo | 79,000 | |
| 10 | 2780 | | | | | | | | | | | | | | 2780 (C) |
| 11 | 25,700 | x | | | 15 | | 10,000 | | | | | | | | |
| 12 | 40,500 | | (2) | | | | | | | | | 40,500 | oo | | |
| 13 | Station | | | | | | 50,000 | | | | | | | | |
| 14 | Station | | | | | | 18,500 | | | | | | | | |
| 15 | 60,000 | | | | | | | | | | | 60,000 | oo | | |
| 16X | 111,900 | x | (3) | | | 200 | 20,000 | | 20,000 | | | | oo | | |
| 17 | 20,000 | | | | | | | | | | | 20,000 | | | |
| 18 | 40,000 | | | | | | | | | | 40,000 | | oo | | |
| 19X | 740,000 | | | | | | | 20,000 | | | 720,000 | o | | | |
| 20 | 20,400 | | | | | | | 20,400 | | | | o | | | |
| 21X | 8500 | | | | | | | 8500 | | | | | | | |

ALT. # FH-2 | NEIGHBORHOOD JAMAICA PLAIN | Fig. VII-25 Continued

# DEVELOPMENT POTENTIAL

| PARCEL | AREA (SQ.FT.) | MIXED USE | ALTERNATE | HOUSING 1-4 FAMILY (D.U.) | HOUSING MULTI FAMILY (D.U.) | HOTEL/MOTEL (ROOMS) | RETAIL AND SERVICE RETAIL (SF BLDG AREA) | AUTO-ORIENTED COMMERCIAL (SF LAND AREA) | OFFICE (SF BLDG. AREA) | MANUFACTURING (SF BLDG.AREA) | INSTITUTIONAL (SF LAND AREA) | OPEN SPACE (SF LAND AREA) | COMMUNITY FACILITY (VARIOUS UNITS) | SELL TO ABUTTORS (SF LAND AREA) | RESELL AS IS (VARIOUS UNITS) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 22 | 13,200 | | | | | | | 13,200 | | | | | | | |
| 24 | 12,600 | | | | | | | | | | 12,600 | | | | |
| 25 | 18,624 | | | 2 | | | | | | | | | | 9624 | |
| 26 | 155,000 | x | (4) | 60 | | | | | | | | 55,000 | oo | | |
| 27X | 29,415 | | | 17 | | | | | | | | | | | |
| 29 | 23,051 | | | 13 | | | | | | | | | | | |
| 30 | 15,821 | | (5) | 8 | | | | | | | | | | | |
| 31 | 3387 | | | | | | | | | | | | | 3387 | |
| 32 | 8386 | | | 3 | | | | | | | | | | | |
| 33 | 4098 | | | 1 | | | | | | | | | | | |
| 34 | 19,760 | | | | | | | | | | | | | 19760 | |
| 35 | 48,500 | | | | | | | | | | | 48,500 | oo | | |
| 36 | 35,500 | | | | | | | | | | | 35,500 | oo | | |
| 37 | future air rts. | | (7) | | | | | | | | | | | | |
| 38 | 8000 | | | | | | | | | | | o | | 8000 | |
| 39 | 11,000 | | | | | | | | | | | 11,000 | | | |
| 40X | 216,700 | | | | | | | | | | 216,700 | | | | |
| 41X | 247,400 | | | | | | | | | | 247,400 | | | | |
| 43X | 3300 | | | | | | | | | | | | | | 3300 (D) |

ALT. # FH-2 | NEIGHBORHOOD JAMAICA PLAIN | Fig. VII-25 Continued

## DEVELOPMENT POTENTIAL

| PARCEL | AREA (SQ.FT.) | MIXED USE | ALTERNATE | HOUSING 1-4 FAMILY (D.U.) | HOUSING MULTI FAMILY (D.U.) | HOTEL/MOTEL (ROOMS) | RETAIL AND SERVICE RETAIL (SF BLDG AREA) | AUTO-ORIENTED COMMERCIAL (SF LAND AREA) | OFFICE (SF BLDG. AREA) | MANUFACTURING (SF BLDG.AREA) | INSTITUTIONAL (SF LAND AREA) | OPEN SPACE (SF LAND AREA) | COMMUNITY FACILITY (VARIOUS UNITS) | SELL TO ABUTTORS (SF LAND AREA) | RESELL AS IS (VARIOUS UNITS) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 44 | 2000 | | | | | | | | | | | | | | 2000(E) |
| 45 | 42,000 | x | (8) | | 18 | | | | | | | o | oo | | 12,000(F) |
| 46 | 6000 | x | | 2 | | | 2000 | | | | | | oo | | |
| 48 | Station | | | | | | 2400 | | | | | | | | |
| 49X | 27,800 | x | | | | | 5000 | 17,800 | | | | | | | |
| 50 | 3541 | | | | | | | | | | | | | 3541 | |
| 51 | 1000 | | | | | | | | | | | | | 1000 | |
| 52 | 102,000 | | | | | | | | | | | 102,000 | oo | | |
| 53 | 29,000 | | | | | | | | | | | 29,000 | oo | | |
| 54 | 23,800 | | | | | | | | | | | 23,800 | oo | | |
| 55 | 8400 | | | 3 | | | | | | | | | | | |
| 56 | 153,000 | | | | | | | | | | | 153,000 | oo | | |
| 57 | 6100 | | | | | | | | | | | 6100 | | | |
| 58X | 12,480 | | | | | | | | | | | | | 12,480 | |
| 59 | Station | | | | | | 2400 | | | | | | | | |
| 60X | 21,697 | x | (11) | | 10 | | 5000 | | | | | | | | |
| 61X | 4550 | | (11) | | | | 4000 | | | | | | | | |
| 62X | 30,879 | | (12) | | 18 | | | | | | | | oo | | |
| 63 | 64,100 | x | (13) | | 18 | | | | | | | 30,000 | oo | | |

ALT. # FH-2 | NEIGHBORHOOD JAMAICA PLAIN | Fig. VII-25 Continued

## DEVELOPMENT POTENTIAL

| PARCEL | AREA (SQ.FT.) | MIXED USE | ALTERNATE | HOUSING 1-4 FAMILY (D.U.) | HOUSING MULTI FAMILY (D.U.) | HOTEL/MOTEL (ROOMS) | RETAIL AND SERVICE RETAIL (SF BLDG AREA) | AUTO-ORIENTED COMMERCIAL (SF LAND AREA) | OFFICE (SF BLDG, AREA) | MANUFACTURING (SF BLDG.AREA) | INSTITUTIONAL (SF LAND AREA) | OPEN SPACE (SF LAND AREA) | COMMUNITY FACILITY (VARIOUS UNITS) | SELL TO ABUTTORS (SF LAND AREA) | RESELL AS IS (VARIOUS UNITS) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 64 | 39,500 | | | | | | | | | | | 39,500 | | | |
| 65 | 14,202 | | (14) | | | | | 14,202 | | | | | | | |
| 66 | 48,117 | | (14) | | | | | 48,117 | | | | | | | |
| 67 | 92,600 | | (14) | | | | | 92,600 | | | | | | | |
| 69 | 15,800 | | | | | | | 15,800 | | | | o | oo | | |
| 71 | 79,000 | x | | | | | 15,000 | 49,000 | | | | o | oo | | |
| 73X | 11,867 | | | | | | | 11,867 | | | | | | | |
| 74X | 14,177 | x | | | 10 | | 5.000 | | | | | | | | |
| 75X | 249,562 | x | | | | | | | | 50,000 | 100,000 | 49,562 | oo | | |
| Greenbelt | 350,600 | | | | | | | | | | | 350,600 | oo | | |
| | | | | | | | | | | | | | | | |
| Totals | | | | 109 | 89 | 200 | 139,300 | 467,011 | 20,000 | 104,726 | 1,336,700 | 1,068,762 | varies | 136,792 | 81,684 |

ALT. # FH-3 | NEIGHBORHOOD JAMAICA PLAIN | Fig. VII-26

# DEVELOPMENT POTENTIAL

| PARCEL | AREA (SQ.FT.) | MIXED USE | ALTERNATE | HOUSING 1-4 FAMILY (D.U.) | HOUSING MULTI FAMILY (D.U.) | HOTEL/MOTEL (ROOMS) | RETAIL AND SERVICE RETAIL (SF BLDG AREA) | AUTO-ORIENTED COMMERCIAL (SF LAND AREA) | OFFICE (SF BLDG. AREA) | MANUFACTURING (SF BLDG.AREA) | INSTITUTIONAL (SF LAND AREA) | OPEN SPACE (SF LAND AREA) | COMMUNITY FACILITY (VARIOUS UNITS) | SELL TO ABUTTORS (SF LAND AREA) | RESELL AS IS (VARIOUS UNITS) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 115,000 | | | | | | | 115,000 | | | | | | | |
| 2 | 51,415 | | (1) | | | | | | | | | | | | 51,415 (A) |
| 3 | 10,189 | | (1) | | | | | | | | | | | | 10,189 (B) |
| 4 | 36,000 | | (1) | | | | | | | | | 36,000 | oo | | |
| 5 | 54,726 | | (1) | | | | | | | 54,726 | | | | | |
| 6 | 6273 | | | | | | | 6273 | | | | | | | |
| 8 | 7600 | | | | | | | 7600 | | | | | | | |
| 9 | 99,000 | x | | | | | | 20,000 | | | | | | 79,000 | |
| 10 | 2780 | | | | | | | | | | | | | | 2780 (C) |
| 11 | 25,700 | x | | | 15 | | 10,000 | | | | | | oo | | |
| 12 | 40,500 | | (2) | | | | | | | | | 40,500 | oo | | |
| 14 | Station | | | | | | 10,000 | | | | | | | | |
| 15 | 60,000 | | | | | | 15,000 | | | | | 45,000 | oo | | |
| 16X | 111,900 | x | (3) | | | 200 | 20,000 | | 20,000 | | | | oo | | |
| 17 | 20,000 | | | | | | | | | | | 20,000 | | | |
| 18 | 40,000 | | | | | | | | | | 40,000 | | oo | | |
| 19X | 740,000 | | | | | | | 20,000 | | | 720,000 | o | | | |
| 20X & 21X | 43,700 | | | | | | | 43,700 | | | | | | | |
| 22 | 25,600 | | | | | | | 25,600 | | | | | | | |

ALT. # FH-3 | NEIGHBORHOOD JAMAICA PLAIN | Fig. VII-26 Continued

DEVELOPMENT POTENTIAL

| PARCEL | AREA (SQ.FT.) | MIXED USE | ALTERNATE | HOUSING 1-4 FAMILY (D.U.) | HOUSING MULTI FAMILY (D.U.) | HOTEL/MOTEL (ROOMS) | RETAIL AND SERVICE RETAIL (SF BLDG AREA) | AUTO-ORIENTED COMMERCIAL (SF LAND AREA) | OFFICE (SF BLDG. AREA) | MANUFACTURING (SF BLDG.AREA) | INSTITUTIONAL (SF LAND AREA) | OPEN SPACE (SF LAND AREA) | COMMUNITY FACILITY (VARIOUS UNITS) | SELL TO ABUTTORS (SF LAND AREA) | RESELL AS IS (VARIOUS UNITS) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 23 | 99,000 | | | | | | | | | | | | | 99,000 | |
| 24 | 12,600 | | | | | | | | | | 12,600 | | | | |
| 25 | 18,624 | | | 2 | | | | | | | | | | 9624 | |
| 26 | 182,800 | x | (4) | 60 | | | | | | | | 82,800 | oo | | |
| 27X | 29,415 | | | 17 | | | | | | | | | | | |
| 28 | 33,500 | | | | | | | | | | | 33,500 | oo | | |
| 29 | 23,051 | | | 13 | | | | | | | | | | | |
| 30 | 15,821 | | (5) | 8 | | | | | | | | | | | |
| 31 | 3387 | | | | | | | | | | | | | 3387 | |
| 32 | 8386 | | | 3 | | | | | | | | | | | |
| 33 | 4098 | | | 1 | | | | | | | | | | | |
| 34 | 19,760 | | | | | | | | | | | | | 19,760 | |
| 35 | 83,200 | | (6) | | | | | | | | | 83,200 | oo | | |
| 36 | 70,500 | | (6) | | | | | | | | | 70,500 | oo | | |
| 38 | 20,300 | | | | | | | | | | | o | | 20,300 | |
| 39 | 22,500 | | | | | | | | | | | 22,500 | | | |
| 40X | 216,700 | | | | | | | | | | 216,700 | | | | |
| 41X | 247,400 | | | | | | | | | | 247,400 | | | | |
| 42 | 5735 | | | | | | | | | | | | | 5735 | |

ALT. # FH-3 | NEIGHBORHOOD JAMAICA PLAIN | Fig. VII-26 Continued

DEVELOPMENT POTENTIAL

| PARCEL | AREA (SQ.FT.) | MIXED USE | ALTERNATE | HOUSING 1-4 FAMILY (D.U.) | HOUSING MULTI FAMILY (D.U.) | HOTEL/MOTEL (ROOMS) | RETAIL AND SERVICE RETAIL (SF BLDG AREA) | AUTO-ORIENTED COMMERCIAL (SF LAND AREA) | OFFICE (SF BLDG. AREA) | MANUFACTURING (SF BLDG.AREA) | INSTITUTIONAL (SF LAND AREA) | OPEN SPACE (SF LAND AREA) | COMMUNITY FACILITY (VARIOUS UNITS) | SELL TO ABUTTORS (SF LAND AREA) | RESELL AS IS (VARIOUS UNITS) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 44 | 3060 | | | | | | | | | | | | | | 3060 (E) |
| 45 | 51,767 | x | (8) | | 24 | | | | | | | o | oo | | 12,000 (F) |
| 46 | 8563 | X | | 4 | | | 3000 | | | | | | oo | | |
| 47 | 3000 | | | | | | | | | | | 3000 | | | |
| 48 | Station | | | | | | 2400 | | | | | | | | |
| 49X | 24,000 | x | | | | | 5000 | 14,000 | | | | | oo | | |
| 52 | 175,500 | | | | | | | | | | | 175,500 | oo | | |
| 53 | 52,500 | | | | | | | | | | | 52,500 | | | |
| 54 | 49,500 | | | | | | | | | | | 49,500 | | | |
| 56 | 220,000 | | | | | | | | | | | 220,000 | oo | | |
| 57 | 8200 | | | | | | | | | | | 8200 | | | |
| 58X | 12,480 | | | | | | | | | | | | | 12,480 | |
| 59 | Station | | | | | | 2400 | | | | | | | | |
| 60X | 21,697 | x | (11) | | 10 | | 5000 | | | | | | | | |
| 61X | 4550 | | (11) | | | | 4000 | | | | | | | | |
| 62X | 30,879 | | (12) | | 18 | | | | | | | | oo | | |
| 63 | 65,500 | | | | | | | | | | | 65,500 | oo | | |
| 64 | 39,500 | | | | | | | | | | | | | 39,500 | |
| 65 | 14,202 | | (14) | | | | | 14,202 | | | | | | | |

ALT. # FH - 3 | NEIGHBORHOOD JAMAICA PLAIN | Fig. VII-26 Continued

DEVELOPMENT POTENTIAL

| PARCEL | AREA (SQ.FT.) | MIXED USE | ALTERNATE | HOUSING 1-4 FAMILY (D.U.) | HOUSING MULTI FAMILY (D.U.) | HOTEL/MOTEL (ROOMS) | RETAIL AND SERVICE RETAIL (SF BLDG AREA) | AUTO-ORIENTED COMMERCIAL (SF LAND AREA) | OFFICE (SF BLDG. AREA) | MANUFACTURING (SF BLDG.AREA) | INSTITUTIONAL (SF LAND AREA) | OPEN SPACE (SF LAND AREA) | COMMUNITY FACILITY (VARIOUS UNITS) | SELL TO ABUTTORS (SF LAND AREA) | RESELL AS IS (VARIOUS UNITS) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 66 | 48,117 | | (14) | | | | | 48,117 | | | | | | | |
| 67 | 92,600 | | (14) | | | | | 92,600 | | | | | | | |
| 68 | 52,000 | | | | | | | | | | | 52,000 | | | |
| 69 | 55,500 | | | | | | | 55,500 | | | | o | oo | | |
| 70X | 38,130 | | | | | | | 38,130 | | | | | | | |
| 71 | 100,500 | x | | | | | 15,000 | 70,500 | | | | o | oo | | |
| 72 | 30,931 | x | | | | | 10,000 | 10,931 | | | | | oo | | |
| 73X | 11,867 | | | | | | | 11,867 | | | | | | | |
| 74X | 14,177 | x | | | 10 | | 5000 | | | | | | oo | | |
| 75X | 249,562 | x | | | | | | | | 50,000 | 100,000 | 49,562 | oo | | |
| Greenbelt | 38,600 | | | | | | | | | | | 38,600 | oo | | |
| | | | | | | | | | | | | | | | |
| Totals | | | | 108 | 77 | 200 | 106,800 | 594,020 | 20,000 | 104,726 | 1,336,700 | 1,148,362 | varies | 288,786 | 79,444 |

ALT. # FH-4 | NEIGHBORHOOD JAMAICA PLAIN | Fig. VII-27

## DEVELOPMENT POTENTIAL

| PARCEL | AREA (SQ.FT.) | MIXED USE | ALTERNATE | HOUSING 1-4 FAMILY (D.U.) | HOUSING MULTI FAMILY (D.U.) | HOTEL/MOTEL (ROOMS) | RETAIL AND SERVICE RETAIL (SF BLDG AREA) | AUTO-ORIENTED COMMERCIAL (SF LAND AREA) | OFFICE (SF BLDG. AREA) | MANUFACTURING (SF BLDG.AREA) | INSTITUTIONAL (SF LAND AREA) | OPEN SPACE (SF LAND AREA) | COMMUNITY FACILITY (VARIOUS UNITS) | SELL TO ABUTTORS (SF LAND AREA) | RESELL AS IS (VARIOUS UNITS) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 115,000 | | | | | | | 115,000 | | | | | | | |
| 2 | 51,415 | | (1) | | | | | | | | | | | | 51,415(A) |
| 3 | 10,189 | | (1) | | | | | | | | | | | | 10,189(B) |
| 4 | 36,000 | | (1) | | | | | | | | | 36,000 | oo | | |
| 5 | 54,726 | | (1) | | | | | | | 54,726 | | | | | |
| 6 | 6273 | | | | | | | 6273 | | | | | | | |
| 8 | 7600 | | | | | | | 7600 | | | | | | | |
| 9 | 99,000 | x | | | | | | 20,000 | | | | | | 79,000 | |
| 10 | 2780 | | | | | | | | | | | | | | 2780(C) |
| 11 | 25,700 | x | | | 15 | | 10,000 | | | | | | oo | | |
| 12 | 40,500 | | (2) | | | | | | | | | 40,500 | oo | | |
| 14 | Station | | | | | | 10,000 | | | | | | | | |
| 15 | 60,000 | | | | | | 15,000 | | | | | 45,000 | oo | | |
| 16X | 111,900 | x | (3) | | | 200 | 20,000 | | 20,000 | | | | oo | | |
| 17 | 20,000 | | | | | | | | | | | 20,000 | | | |
| 18 | 40,000 | | | | | | | | | | 40,000 | | oo | | |
| 19X | 740,000 | | | | | | | 20,000 | | | 720,000 | o | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |

ALT. # FH-4 | NEIGHBORHOOD JAMAICA PLAIN | Fig. VII-27 Continued

## DEVELOPMENT POTENTIAL

| PARCEL | AREA (SQ.FT.) | MIXED USE | ALTERNATE | HOUSING 1-4 FAMILY (D.U.) | HOUSING MULTI FAMILY (D.U.) | HOTEL/MOTEL (ROOMS) | RETAIL AND SERVICE RETAIL (SF BLDG AREA) | AUTO-ORIENTED COMMERCIAL (SF LAND AREA) | OFFICE (SF BLDG. AREA) | MANUFACTURING (SF BLDG.AREA) | INSTITUTIONAL (SF LAND AREA) | OPEN SPACE (SF LAND AREA) | COMMUNITY FACILITY (VARIOUS UNITS) | SELL TO ABUTTORS (SF LAND AREA) | RESELL AS IS (VARIOUS UNITS) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 20 | 20,400 | | | | | | | 20,400 | | | | o | | | |
| 21X | 8500 | | | | | | | 8500 | | | | | | | |
| 22 | 13,200 | | | | | | | 13,200 | | | | | | | |
| 23 | 92,000 | | | | | | | | | | | | | 92,000 | |
| 24 | 12,600 | | | | | | | | | | 12,600 | | | | |
| 25 | 18,624 | | | 2 | | | | | | | | | | 9624 | |
| 26 | 144,500 | x | (4) | 60 | | | | | | | | 44,500 | oo | | |
| 27X | 27,300 | | | 16 | | | | | | | | | | | |
| 29 | 25,700 | | | 14 | | | | | | | | | | | |
| 30 | 13,700 | | (5) | 6 | | | | | | | | | | | |
| 31 | 3387 | | | | | | | | | | | | | 3387 | |
| 32 | 8386 | | | 3 | | | | | | | | | | | |
| 33 | 4098 | | | 1 | | | | | | | | | | | |
| 34 | 19,760 | | | | | | | | | | | | | 19,760 | |
| 35 | 33,500 | | | | | | | | | | | 33,500 | oo | | |
| 36 | 20,500 | | | | | | | | | | | 20,500 | oo | | |
| 38 | 20,300 | | | | | | | | | | | o | | 20,300 | |
| 39 | 22,500 | | | | | | | | | | | 22,500 | | | |

ALT. # FH-4 | NEIGHBORHOOD JAMAICA PLAIN | Fig. VII-27 Continued

DEVELOPMENT POTENTIAL

| PARCEL | AREA (SQ.FT.) | MIXED USE | ALTERNATE | HOUSING 1-4 FAMILY (D.U.) | HOUSING MULTI FAMILY (D.U.) | HOTEL/MOTEL (ROOMS) | RETAIL AND SERVICE RETAIL (SF BLDG AREA) | AUTO-ORIENTED COMMERCIAL (SF LAND AREA) | OFFICE (SF BLDG. AREA) | MANUFACTURING (SF BLDG. AREA) | INSTITUTIONAL (SF LAND AREA) | OPEN SPACE (SF LAND AREA) | COMMUNITY FACILITY (VARIOUS UNITS) | SELL TO ABUTTORS (SF LAND AREA) | RESELL AS IS (VARIOUS UNITS) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 40X | 216,700 | | | | | | | | | | 216,700 | | | | |
| 41X | 247,400 | | | | | | | | | | 247,400 | | | | |
| 45 | 38,200 | x | (8) | | 12 | | | | | | | o | oo | | 17,300 (D,E,F) |
| 46 | 5500 | x | | 2 | | | 2000 | | | | | o | oo | | |
| 47 | 12,500 | x | | | 6 | | 6000 | | | | | o | oo | | |
| 48 | Station | | | | | | 2400 | | | | | | | | |
| 49X | 27,800 | x | | | | | 5000 | 17,800 | | | | | | | |
| 52 | 57,500 | | | | | | | | | | | 57,500 | oo | | |
| 53 | 51,000 | | | | | | | | | | | 51,000 | | | |
| 54 | 58,500 | | | | | | | | | | | 58,500 | | | |
| 55 | 7000 | | | 2 | | | | | | | | | | | |
| 56 | 68,400 | | | | | | | | | | | 68,400 | oo | | |
| 57 | 8200 | | | | | | | | | | | 8200 | | | |
| 58X | 12,480 | | | | | | | | | | | | | 12,480 | |
| 59 | Station | | | | | | 2400 | | | | | | | | |
| 60X | 21,697 | x | (11) | | 10 | | 5000 | | | | | | | | |
| 61X | 4550 | | (11) | | | | 4000 | | | | | | | | |
| 62X | 30,879 | | (12) | | 18 | | | | | | | | oo | | |
| 63 | 83,000 | x | (13) | | 18 | | | | | | | 50,000 | oo | | |

ALT. # FH-4 | NEIGHBORHOOD JAMAICA PLAIN

Fig. VII-27 Continued

DEVELOPMENT POTENTIAL

| PARCEL | AREA (SQ.FT.) | MIXED USE | ALTERNATE | HOUSING 1-4 FAMILY (D.U.) | HOUSING MULTI FAMILY (D.U.) | HOTEL/MOTEL (ROOMS) | RETAIL AND SERVICE RETAIL (SF BLDG AREA) | AUTO-ORIENTED COMMERCIAL (SF LAND AREA) | OFFICE (SF BLDG. AREA) | MANUFACTURING (SF BLDG.AREA) | INSTITUTIONAL (SF LAND AREA) | OPEN SPACE (SF LAND AREA) | COMMUNITY FACILITY (VARIOUS UNITS) | SELL TO ABUTTORS (SF LAND AREA) | RESELL AS IS (VARIOUS UNITS) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 64 | 28,200 | | | | | | | | | | | o | | 28,200 | |
| 65 | 14,202 | | | | | | | 14,202 | | | | | | | |
| 66 | 48,117 | | | | | | | 48,117 | | | | | | | |
| 67 | 92,600 | | | | | | | 92,600 | | | | | | | |
| 69 | 15,800 | | | | | | | 15,800 | | | | o | oo | | |
| 71 | 79,000 | x | | | | | 15,000 | 49,000 | | | | o | oo | | |
| 73X | 11,867 | | | | | | | 11,867 | | | | | | | |
| 74X | 14,177 | x | | | 10 | | 5000 | | | | | | | | |
| 75X | 249,562 | x | | | | | | | | 50,000 | 100,000 | 49,562 | oo | | |
| Greenbelt | 417,300 | | | | | | | | | | | 417,300 | oo | | |
| | | | | | | | | | | | | | | | |
| Totals | | | | 106 | 89 | 200 | 101,800 | 460,359 | 20,000 | 104,726 | 1,336,700 | 1,022,962 | varies | 264,751 | 81,684 |

FH-5 | Neighborhood Jamaica Plain | Fig. VII-28

# DEVELOPMENT POTENTIAL

| PARCEL | AREA (SQ.FT.) | MIXED USE | ALTERNATE | HOUSING 1-4 FAMILY (D.U.) | HOUSING MULTI FAMILY (D.U.) | HOTEL/MOTEL (ROOMS) | RETAIL AND SERVICE RETAIL (SF BLDG AREA) | AUTO-ORIENTED COMMERCIAL (SF LAND AREA) | OFFICE (SF BLDG. AREA) | MANUFACTURING (SF BLDG.AREA) | INSTITUTIONAL (SF LAND AREA) | OPEN SPACE (SF LAND AREA) | COMMUNITY FACILITY (VARIOUS UNITS) | SELL TO ABUTTORS (SF LAND AREA) | RESELL AS IS (VARIOUS UNITS) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 97,500 | | | | | | | 97,500 | | | | | | | |
| 2 | 51,415 | | (1) | | | | | | | | | | | | 51,415 (A |
| 3 | 10,189 | | (1) | | | | | | | | | | | | 10,189 (B |
| 4 | 14,700 | | (1) | | | | | | | | | 14,700 | | | |
| 5 | 54,726 | | | | | | | | | 54,726 | | | | | |
| 7X | 24,152 | | | | | | | | | | | | | | 24,152 (G |
| 8 | 8501 | | | | | | | 8501 | | | | | | | |
| 9 | 99,000 | x | | | | | | 20,000 | | | | | oo | 79,000 | |
| 10 | 2780 | | | | | | | | | | | | | | 2780 (C) |
| 11 | 25,700 | x | | | 15 | | 10,000 | | | | | | | | |
| 12 | 40,500 | | (2) | | | | | | | | | 40,500 | oo | | |
| 13 | Station | | | | | | 50,000 | | | | | | | | |
| 14 | Station | | | | | | 18,500 | | | | | | | | |
| 15 | 60,000 | | | | | | | | | | | 60,000 | oo | | |
| 16X | 111,900 | x | (3) | | | 200 | 20,000 | | 20,000 | | | | oo | | |
| 17 | 20,000 | | | | | | | | | | | 20,000 | | | |
| 18 | 40,000 | | | | | | | | | | 40,000 | | oo | | |
| 19X | 730,000 | | | | | | | 20,000 | | | 710,000 | o | | | |
| 20 | 29,800 | | | | | | | 29,800 | | | | | | | |

FH-5 Neighborhood Jamaica Plain

Fig. VII-28 Continued

DEVELOPMENT POTENTIAL

| PARCEL | AREA (SQ.FT.) | MIXED USE | ALTERNATE | HOUSING 1-4 FAMILY (D.U.) | HOUSING MULTI FAMILY (D.U.) | HOTEL/MOTEL (ROOMS) | RETAIL AND SERVICE RETAIL (SF BLDG AREA) | AUTO-ORIENTED COMMERCIAL (SF LAND AREA) | OFFICE (SF BLDG. AREA) | MANUFACTURING (SF BLDG.AREA) | INSTITUTIONAL (SF LAND AREA) | OPEN SPACE (SF LAND AREA) | COMMUNITY FACILITY (VARIOUS UNITS) | SELL TO ABUTTORS (SF LAND AREA) | RESELL AS IS (VARIOUS UNITS) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 21X | 8500 | | | | | | | 8500 | | | | | | | |
| 22 | 25,000 | | | | | | | 25,000 | | | | | | | |
| 24 | 11,600 | | | | | | | | | | 11,600 | | | | |
| 25 | 18,624 | | | 2 | | | | | | | | | | 9624 | |
| 26 | 155,000 | x | (4) | 60 | | | | | | | | 55,000 | oo | | |
| 27X | 29,415 | | | 17 | | | | | | | | | | | |
| 29 | 30,814 | | | 18 | | | | | | | | | | | |
| 30 | 31,400 | | (5) | 18 | | | | | | | | | | | |
| 31 | 3387 | | | | | | | | | | | | | 3387 | |
| 32 | 8386 | | | 3 | | | | | | | | | | | |
| 33 | 4098 | | | 1 | | | | | | | | | | | |
| 33a | 6940 | | | | | | | | | | | | | | 6940 |
| 34 | 19,760 | | | | | | | | | | | | | 19,760 | |
| 34a | 3337 | | | | | | | | | | | | | | 3337 |
| 35 | 32,000 | | | | | | | | | | | 32,000 | oo | | |
| 36 | 32,900 | | | | | | | | | | | 32,900 | oo | | |
| 38 | 8000 | | | | | | | | | | | | | 8000 | |
| 39 | 11,000 | | | | | | | | | | | 11,000 | | | |
| 40X | 216,700 | | | | | | | | | | 216,700 | | | | |

FH-5 Neighborhood Jamaica Plain Fig. VII-28 Continued

# DEVELOPMENT POTENTIAL

| PARCEL | AREA (SQ.FT.) | MIXED USE | ALTERNATE | HOUSING 1-4 FAMILY (D.U.) | HOUSING MULTI FAMILY (D.U.) | HOTEL/MOTEL (ROOMS) | RETAIL AND SERVICE RETAIL (SF BLDG AREA) | AUTO-ORIENTED COMMERCIAL (SF LAND AREA) | OFFICE (SF BLDG. AREA) | MANUFACTURING (SF BLDG. AREA) | INSTITUTIONAL (SF LAND AREA) | OPEN SPACE (SF LAND AREA) | COMMUNITY FACILITY (VARIOUS UNITS) | SELL TO ABUTTORS (SF LAND AREA) | RESELL AS IS (VARIOUS UNITS) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 41X | 247,400 | | | | | | | | | | 247,400 | | | | |
| 43X | 3300 | | | | | | | | | | | | | | 3300 (D) |
| 44 | 2000 | | | | | | | | | | | | | | 2000 (E) |
| 45 | 42,000 | x | (8) | | 18 | | | | | | | o | oo | | 12,000 (F |
| 46 | 6000 | x | | 2 | | | 2000 | | | | | | oo | | |
| 48 | Station | | | | | | 2400 | | | | | | | | |
| 49X | 27,800 | x | | | | | 5000 | 17,800 | | | | | | | |
| 50 | 18,700 | x | | | | | 5000 | | | | | 8700 | oo | | |
| 51 | 6100 | | | | | | | | | | | 6100 | oo | | |
| 52 | 102,000 | | | | | | | | | | | 102,000 | oo | | |
| 53 | 24,600 | | | | | | | | | | | 24,600 | oo | | |
| 54 | 52,000 | | | | | | | | | | | 52,000 | oo | | |
| 55 | 8400 | | | 3 | | | | | | | | | | | |
| 56 | 110,500 | | | | | | | | | | | 110,500 | oo | | |
| 57 | 17,000 | x | | 6 | | | 3000 | | | | | | | | |
| 57X | 7731 | x | | 2 | | | 1000 | | | | | | | | |
| 58 | 12,480 | | | | | | | | | | | 12,480 | oo | | |
| 59 | Station | | | | | | 2400 | | | | | | | | |
| 60X | 21,697 | x | (11 | | 10 | | 5000 | | | | | | | | |

FH-5 | Neighborhood Jamaica Plain | Fig. VII-28 Continued

DEVELOPMENT POTENTIAL

| PARCEL | AREA (SQ.FT.) | MIXED USE | ALTERNATE | HOUSING 1-4 FAMILY (D.U.) | HOUSING MULTI FAMILY (D.U.) | HOTEL/MOTEL (ROOMS) | RETAIL AND SERVICE RETAIL (SF BLDG AREA) | AUTO-ORIENTED COMMERCIAL (SF LAND AREA) | OFFICE (SF BLDG. AREA) | MANUFACTURING (SF BLDG.AREA) | INSTITUTIONAL (SF LAND AREA) | OPEN SPACE (SF LAND AREA) | COMMUNITY FACILITY (VARIOUS UNITS) | SELL TO ABUTTORS (SF LAND AREA) | RESELL AS IS (VARIOUS UNITS) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 61a | 4550 | | (11) | | | | 4000 | | | | | | | | |
| 61b | 4413 | | (11) | | | | | | | | | | | | 4413(H) |
| 62X | 30,879 | | (12) | | 18 | | | | | | | | oo | | |
| 63 | 61,900 | x | (13) | | 18 | | | | | | | 30,000 | oo | | |
| 64 | 15,800 | | | | | | | | | | | 15,800 | | | |
| 64a | 7450 | | | | | | | | | | | 7450 | | | |
| 65 | 14,202 | | (14) | | | | | 14,202 | | | | | | | 3000(I) |
| 65a | 7983 | x | | 3 | | | | | | | | | | | |
| 65X | 7197 | | | 3 | | | | | | | | | | | |
| 66 | 130,400 | | (14) | | | | | 130,400 | | | | | | | |
| 69 | 20,300 | | | | | | | 20,300 | | | | o | oo | | |
| 71 | 78,600 | x | | | | | 15,000 | 48,600 | | | | o | oo | | |
| 73X | 11,867 | | | | | | | 11,867 | | | | | | | |
| 74 | 14,177 | x | | | 10 | | 5000 | | | | | | | | |
| 75X | 249,562 | x | | | | | | | | 50,000 | 100,000 | 49,562 | oo | | |
| Greenbelt | 350,600 | | | | | | | | | | | 350,600 | | | |
| | | | | | | | | | | | | | | | |
| Totals | | | | 138 | 89 | 200 | 148,300 | 452,470 | 20,000 | 104,726 | 1,325,700 | 1,035,892 | Varies | 119,771 | 123,526 |

FH-6 | Neighborhood Jamaica Plain | Fig. VII-29

DEVELOPMENT POTENTIAL

| PARCEL | AREA (SQ.FT.) | MIXED USE | ALTERNATE | HOUSING 1-4 FAMILY (D.U.) | HOUSING MULTI FAMILY (D.U.) | HOTEL/MOTEL (ROOMS) | RETAIL AND SERVICE RETAIL (SF BLDG AREA) | AUTO-ORIENTED COMMERCIAL (SF LAND AREA) | OFFICE (SF BLDG. AREA) | MANUFACTURING (SF BLDG.AREA) | INSTITUTIONAL (SF LAND AREA) | OPEN SPACE (SF LAND AREA) | COMMUNITY FACILITY (VARIOUS UNITS) | SELL TO ABUTTORS (SF LAND AREA) | RESELL AS IS (VARIOUS UNITS) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 97,500 | | | | | | | 97,500 | | | | | | | |
| 2 | 51,415 | | (1) | | | | | | | | | | | | 51,415(A |
| 3 | 10,189 | | (1) | | | | | | | | | | | | 10,189(B |
| 4 | 14,700 | | (1) | | | | | | | | | 14,700 | | | |
| 5 | 54,726 | | | | | | | | | 54,726 | | | | | |
| 7X | 24,152 | | | | | | | | | | | | | | 24,152(G |
| 8 | 8501 | | | | | | | 8501 | | | | | | | |
| 9 | 99,000 | x | | | | | | 20,000 | | | | | oo | 79,000 | |
| 10 | 2780 | | | | | | | | | | | | | | 2780(C) |
| 11 | 25,700 | x | | | 15 | | 10,000 | | | | | | | | |
| 12 | 40,500 | | (2) | | | | | | | | | 40,500 | oo | | |
| 13 | Station | | | | | | 50,000 | | | | | | | | |
| 14 | Station | | | | | | 18,500 | | | | | | | | |
| 15 | 60,000 | | | | | | | | | | | 60,000 | oo | | |
| 16X | 111,900 | x | (3) | | | 200 | 20,000 | | 20,000 | | | | oo | | |
| 17 | 20,000 | | | | | | | | | | | 20,000 | | | |
| 18 | 40,000 | | | | | | | | | | 40,000 | | oo | | |
| 19X | 740,000 | | | | | | | 20,000 | | | 720,000 | o | | | |

FH-6 | Neighborhood Jamaica Plain | Fig. VII-29 Continued

DEVELOPMENT POTENTIAL

| PARCEL | AREA (SQ.FT.) | MIXED USE | ALTERNATE | HOUSING 1-4 FAMILY (D.U.) | HOUSING MULTI FAMILY (D.U.) | HOTEL/MOTEL (ROOMS) | RETAIL AND SERVICE RETAIL (SF BLDG AREA) | AUTO-ORIENTED COMMERCIAL (SF LAND AREA) | OFFICE (SF BLDG. AREA) | MANUFACTURING (SF BLDG.AREA) | INSTITUTIONAL (SF LAND AREA) | OPEN SPACE (SF LAND AREA) | COMMUNITY FACILITY (VARIOUS UNITS) | SELL TO ABUTTORS (SF LAND AREA) | RESELL AS IS (VARIOUS UNITS) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 20X &21X | 43,700 | | | | | | | 43,700 | | | | | | | |
| 22 | 25,000 | | | | | | | 25,000 | | | | | | | |
| 23 | 111,000 | | | | | | | | | | | | | 111,000 | |
| 24 | 11,600 | | | | | | | | | | 11,600 | | | | |
| 25 | 18,624 | | | 2 | | | | | | | | | | 9624 | |
| 26 | 155,000 | x | (4) | 60 | | | | | | | | 55,000 | oo | | |
| 27X | 29,415 | | | 17 | | | | | | | | | | | |
| 29 | 30,814 | | | 18 | | | | | | | | | | | |
| 30 | 15,821 | | (5) | 8 | | | | | | | | | | | |
| 31 | 3387 | | | | | | | | | | | | | 3387 | |
| 32 | 8386 | | | 3 | | | | | | | | | | | |
| 33 | 4098 | | | 1 | | | | | | | | | | | |
| 33a | 6940 | | | | | | | | | | | | | | 6940 |
| 34 | 19,760 | | | | | | | | | | | | | 19,760 | |
| 34a | 3337 | | | | | | | | | | | | | | 3337 |
| 35 | 48,500 | | | | | | | | | | | 48,500 | oo | | |
| 36 | 49,000 | | | | | | | | | | | 49,000 | | | |
| 38 | 40,500 | | | | | | | | | | | 40,500 | | | |
| 39 | 64,900 | | | | | | | | | | | 64,900 | | | |

FH-6 | Neighborhood Jamaica Plain | Fig. VII-29 Continued

DEVELOPMENT POTENTIAL

| PARCEL | AREA (SQ.FT.) | MIXED USE | ALTERNATE | HOUSING 1-4 FAMILY (D.U.) | HOUSING MULTI FAMILY (D.U.) | HOTEL/MOTEL (ROOMS) | RETAIL AND SERVICE RETAIL (SF BLDG AREA) | AUTO-ORIENTED COMMERCIAL (SF LAND AREA) | OFFICE (SF BLDG. AREA) | MANUFACTURING (SF BLDG.AREA) | INSTITUTIONAL (SF LAND AREA) | OPEN SPACE (SF LAND AREA) | COMMUNITY FACILITY (VARIOUS UNITS) | SELL TO ABUTTORS (SF LAND AREA) | RESELL AS IS (VARIOUS UNITS) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 40X | 216,700 | | | | | | | | | | 216,700 | | | | |
| 41X | 247,400 | | | | | | | | | | 247,400 | | | | |
| 43X | 3300 | | | | | | | | | | | | | | 3300(D) |
| 44 | 2000 | | | | | | | | | | | | | | 2000(E) |
| 45 | 42,000 | x | (8) | | 18 | | | | | | | o | oo | | 12,000(F) |
| 46 | 6000 | x | | 2 | | | 2000 | | | | | | oo | | |
| 48 | Station | | | | | | 2400 | | | | | | | | |
| 49X | 27,800 | x | | | | | 5000 | 17,800 | | | | | oo | | |
| 52 | 97,000 | | | | | | | | | | | 97,000 | oo | | |
| 53 | 74,100 | | (9) | | | | | | | | | 74,100 | oo | | |
| 54 | 146,900 | | (9) | | | | | | | | | 146,900 | oo | | |
| 55 | 8400 | | | 3 | | | | | | | | | | | |
| 56 | 91,500 | | | | | | | | | | | 91,500 | oo | | |
| 57 | 24,600 | | | | 10 | | 5000 | | | | | 5000 | | | |
| 58 | 12,480 | | | | | | | | | | | 12,480 | | | |
| 59 | Station | | | | | | 2400 | | | | | | | | |
| 60X | 21,697 | | (11) | | 10 | | 5000 | | | | | | | | |
| 61a | 4550 | | (11) | | | | 4000 | | | | | | | | |
| 61b | 4413 | | | | | | | | | | | | | | 4413(H) |

FH-6 | Neighborhood Jamaica Plain | Fig. VII-29 Continued

DEVELOPMENT POTENTIAL

| PARCEL | AREA (SQ.FT.) | MIXED USE | ALTERNATE | HOUSING 1-4 FAMILY (D.U.) | HOUSING MULTI FAMILY (D.U.) | HOTEL/MOTEL (ROOMS) | RETAIL AND SERVICE RETAIL (SF BLDG AREA) | AUTO-ORIENTED COMMERCIAL (SF LAND AREA) | OFFICE (SF BLDG. AREA) | MANUFACTURING (SF BLDG.AREA) | INSTITUTIONAL (SF LAND AREA) | OPEN SPACE (SF LAND AREA) | COMMUNITY FACILITY (VARIOUS UNITS) | SELL TO ABUTTORS (SF LAND AREA) | RESELL AS IS (VARIOUS UNITS) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 62X | 30,879 | | (12) | | 18 | | | | | | | | oo | | |
| 63 | 48,200 | | | | | | | | | | | 48,200 | oo | | |
| 64 | 55,000 | | | | | | | | | | | 55,000 | | | |
| 64a | 7450 | | | | | | | | | | | 7450 | oo | | |
| 65 | 14,202 | | (14) | | | | | 14,202 | | | | | | | |
| 65a | 7983 | X | | 3 | | | | | | | | | | | 3000(I) |
| 65X | 7197 | | | 3 | | | | | | | | | | | |
| 66 | 48,117 | | (14) | | | | | 48,117 | | | | | | | |
| 67 | 74,100 | | (14) | | | | | | | | | 74,100 | | | |
| 68 | 52,800 | | (14) | | | | | | | | | 52,800 | | | |
| 69 | 58,800 | | | | | | | 58,800 | | | | | | | |
| 70X | 38,130 | | | | | | | 38,130 | | | | | | | |
| 71 | 142,900 | X | | | | | 25,000 | 92,900 | | | | | | | |
| 73X | 11,867 | | | | | | | 11,867 | | | | | | | |
| 74 | 14,177 | | | | 10 | | 5000 | | | | | | | | |
| 75X | 249,562 | X | | | | | | | | 50,000 | 100,000 | 49,562 | oo | | |
| Greenbelt | 38,500 | | | | | | | | | | | 38,500 | | | |
| | | | | | | | | | | | | | | | |
| Totals | | | | 120 | 81 | 200 | 154,300 | 496,517 | 20,000 | 104,726 | 1,335,700 | 1,145,692 | varies | 222,771 | 123,526 |

# DEVELOPMENT POTENTIAL
# ROXBURY
# FIGURE VII-30 TO VII-41

Fig. VII-30 DEVELOPMENT POTENTIAL - SUMMARY - ROXBURY

| ALTERNATIVE | HOUSING 1-4 FAMILY (D.U.) | HOUSING MULTI FAMILY (D.U.) | HOTEL/MOTEL (ROOMS) | RETAIL AND SERVICE RETAIL (SF BLDG AREA) | AUTO-ORIENTED COMMERCIAL (SF LAND AREA) | OFFICE (SF BLDG. AREA) | MANUFACTURING (SF BLDG.AREA) | INSTITUTIONAL (SF LAND AREA) | OPEN SPACE (SF LAND AREA) | COMMUNITY FACILITY (VARICUS UNITS) | SELL TO ABUTTORS (SF LAND AREA) | RESELL AS IS (VARIOUS UNITS) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FH-1 | | 200 | 300 | 175,000 | 444,000 | | 52,500 | 600,000 | 181,000 | | | |
| FH-2 | | 200 | 300 | 175,000 | | 150,000 | 52,500 | 851,000 | 248,500 | | | |
| FH-2a | | 200 | 300 | 200,000 | | 150,000 | 52,500 | 851,000 | 248,500 | | | |
| FH-2b | | 200 | 300 | 175,000 | | 150,000 | 52,500 | 851,000 | 293,000 | | | |
| FH-3 | | 200 | 300 | 175,000 | 440,000 | | 52,500 | 600,000 | 207,000 | | | |
| FH-4 | | 200 | 300 | 175,000 | | 150,000 | 52,500 | 851,000 | 266,000 | | | |
| FH-4a | | 200 | 300 | 175,000 | | 150,000 | 52,500 | 851,000 | 266,000 | | | |
| FH-4b | | 200 | 300 | 175,000 | | 150,000 | 52,500 | 851,000 | 310,500 | | | |
| FH-5 | | 200 | 300 | 185,000 | | 150,000 | 79,000 | 752,000 | 204,000 | | | |
| FH-6 | | 200 | 300 | 210,000 | | 150,000 | 79,000 | 752,000 | 204,000 | | | |
| FH-6a | | 200 | 300 | 185,000 | | 150,000 | 79,000 | 752,000 | 204,000 | | | |
| See Footnoes | | (2) (3) (4) | | | | (1) (2) | (5) (8) | (1) (5) (7) | (6) | | | |

Fig. VII - 30 (Continued)

Summary - Development Potential - Roxbury

Explanation of notes and symbols:

o Indicates dedication of a portion of the parcel for open space use to accommodate such uses as the Regional Trail, bike path, and a "green-belt" concept.

oo Indicates the possibility of providing a community facility as part of the proposed development. This facility could take many forms, such as a health center, community center, a recreational facility, etc.

(1) In Alternatives FH-1 and FH-3, parcel 18 could be developed for 150,000 S.F. of office space or some unit of institutional use rather than the hotel indicated. Also, retail space could be expanded greatly and the other uses reduced accordingly.

(2) In Alternatives FH-1 and FH-3, parcel 18b could be developed for 200 residential units or 150,000 S.F. of office space with retail use reduced accordingly.

(3) In Alternative FH-1, FH-2, FH-5, and FH-6, and in Alternatives FH-5 and FH-6 parcel 25 and parcel 20 could be developed for 100 to 150 residential units rather than the indicated retail.

(4) In Alternatives FH-1, FH-2 parcel (25 + 25X); could be developed for 100 to 150 residential units rather than the indicated manufacturing use.

(5) In Alternatives FH-1 and FH-3 parcel 27 could be developed for manufacturing uses (100,000 S.F.) or an extension of Roxbury Community College (reached via bridges across Columbus Avenue from their man location) rather than the indicated auto-oriented uses.

(6) In all alternatives parcel (34 + 34X) could be developed for major open space use rather than the housing and retail use indicated.

(7) In Alternatives FH-2, FH-4, FH5, and FH-6, parcel 19 could be developed for 300 residential units and/or some unit of institutional uses: the hotel and retail use indicated would be reduced accordingly.

(8) In Alternatives FH-5 and FH-6 land abutting manufacturing uses having a 1:2 slope.

ALT. # FH-1 | NEIGHBORHOOD ROXBURY

Fig. VII-31

# DEVELOPMENT POTENTIAL

| PARCEL | AREA (SQ.FT.) | MIXED USE | ALTERNATE | HOUSING 1-4 FAMILY (D.U.) | HOUSING MULTI FAMILY (D.U.) | HOTEL/MOTEL (ROOMS) | RETAIL AND SERVICE RETAIL (SF BLDG AREA) | AUTO-ORIENTED COMMERCIAL (SF LAND AREA) | OFFICE (SF BLDG. AREA) | MANUFACTURING (SF BLDG.AREA) | INSTITUTIONAL (SF LAND AREA) | OPEN SPACE (SF LAND AREA) | COMMUNITY FACILITY (VARIOUS UNITS) | SELL TO ABUTTORS (SF LAND AREA) | RESELL AS IS (VARIOUS UNITS) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 16 | -- | | | | | | | | | | | | | | |
| 17 | 56,000 | | | | | | | | | | | 56,000 | | | |
| 17X | 191,000 | | | | | | | | | | | o | | | |
| 18 | 131,500 | x | (1) | | | 300 | 15,000 | | (1) | | (1) | o | oo | | |
| 18a | 15,000 | | | | | | | | | | | 15,000 | | | |
| 18b | 122,000 | x | (2) | | (2) | | 60,000 | | (2) | | | o | oo | | |
| 19 | 26,000 | | | | | | | | | | | 26,000 | | | |
| 20 | 73,500 | x | (3) | | (3) | | 25,000 | | | | | o | oo | | |
| 21 | 29,000 | | | | | | | | | | | 29,000 | | | |
| 22 | 172,500 | | | | | | | 172,500 | | | | o | | | |
| 22a | 33,000 | | | | | | | 33,000 | | | | o | | | |
| 22b | 70,000 | | | | | | | | | | 70,000 | o | | | |
| 23 | 7,000 | | | | | | | | | | | 7,000 | | | |
| 24 | 107,500 | | | | | | | | | | 107,500 | o | | | |
| 25 | 13,000 | | | | | | | | | | | | | | |
| 25X | 66,000 | | | | | | | | | | | | | | |
| 25 + 25X | 79,000 | | (4) | | (4) | | | | | 40,000 | | | (4) | | |
| 25a | 4,500 | | | | | | | | | | | | | | |
| 26 | 98,000 | | | | | | | | | | | | | | |

ALT. # FH-1 | NEIGHBORHOOD ROXBURY

Fig. VII-31 Continued

DEVELOPMENT POTENTIAL

| PARCEL | AREA (SQ.FT.) | MIXED USE | ALTERNATE | HOUSING 1-4 FAMILY (D.U.) | HOUSING MULTI FAMILY (D.U.) | HOTEL/MOTEL (ROOMS) | RETAIL AND SERVICE RETAIL (SF BLDG AREA) | AUTO-ORIENTED COMMERCIAL (SF LAND AREA) | OFFICE (SF BLDG. AREA) | MANUFACTURING (SF BLDG.AREA) | INSTITUTIONAL (SF LAND AREA) | OPEN SPACE (SF LAND AREA) | COMMUNITY FACILITY (VARIOUS UNITS) | SELL TO ABUTTORS (SF LAND AREA) | RESELL AS IS (VARIOUS UNITS) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 26X | 102,000 | | | | | | | | | | | | | | |
| 26 + 26X | 200,000 | | | | | | | | | | 200,000 | o | | | |
| 27 | 206,000 | x | (5) | | | | | 206,000 | | (5) | (5) | o | | | |
| 28 | 109,000 | | | | | | | | | | 109,000 | o | | | |
| 29 | 48,000 | | | | | | | | | | | 48,000 | | | |
| 30 | 40,500 | | | | | | | | | | 40,500 | o | | | |
| 31 | 25,000 | | | | | | | | | 12,500 | | | | | |
| 32 | 73,000 | | | | | | | | | | 73,000 | o | | | |
| 33 | -- | | | | | | | | | | | | | | |
| 34 | 31,500 | | | | | | | | | | | | | | |
| 34X | 223,500 | | | | | | | | | | | | | | |
| 34 + 34X | 255,000 | x | (6) | | 200 | | 75,000 | | | | | o | oo | | |
| 35 | 32,500 | | | | | | | 32,500 | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| TOTALS | | | | | 200 | 300 | 175,000 | 440,000 | | 52,500 | 600,000 | 181,000 | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |

ALT. # FH-2 | NEIGHBORHOOD ROXBURY | Fig. VII-32

## DEVELOPMENT POTENTIAL

| PARCEL | AREA (SQ.FT.) | MIXED USE | ALTERNATE | HOUSING 1-4 FAMILY (D.U.) | HOUSING MULTI FAMILY (D.U.) | HOTEL/MOTEL (ROOMS) | RETAIL AND SERVICE RETAIL (SF BLDG AREA) | AUTO-ORIENTED COMMERCIAL (SF LAND AREA) | OFFICE (SF BLDG. AREA) | MANUFACTURING (SF BLDG.AREA) | INSTITUTIONAL (SF LAND AREA) | OPEN SPACE (SF LAND AREA) | COMMUNITY FACILITY (VARIOUS UNITS) | SELL TO ABUTTORS (SF LAND AREA) | RESELL AS IS (VARIOUS UNITS) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 16 | 29,000 | | | | | | | | | | | | | | |
| 16X | 54,000 | | | | | | | | | | | | | | |
| 16 + 16X | 83,000 | | | | | | | | | | | 83,000 | oo | | |
| 17 | 56,000 | | | | | | | | | | | 56,000 | | | |
| 17X | 191,000 | | | | | | | | | | | o | | | |
| 18 | 255,000 | x | (7) | | (7) | 300 | 75,000 | | 150,000 | | (7) | o | oo | | |
| 18a | 15,000 | | | | | | | | | | | 15,000 | | | |
| 19 | 26,000 | | | | | | | | | | | 26,000 | | | |
| 20 | 92,000 | x | (3) | | (3) | | 25,000 | | | | | o | oo | | |
| 21 | 18,500 | | | | | | | | | | | 18,500 | | | |
| 22 | 297,000 | | | | | | | | | | 297,000 | o | | | |
| 23 | 8,000 | | | | | | | | | | | 8,000 | | | |
| 24 | 66,000 | | | | | | | | | | 66,000 | o | | | |
| 25 | 13,000 | | | | | | | | | | | | | | |
| 25X | 66,000 | | | | | | | | | | | | | | |
| 25 + 25X | 79,000 | | (4) | | (4) | | | | | 40,000 | | o | (4) | | |
| 25a | 4,500 | | | | | | | | | | | o | | | |
| 26 | 167,000 | | | | | | | | | | | | | | |
| 26X | 102,000 | | | | | | | | | | | | | | |

ALT. # FH-2 NEIGHBORHOOD ROXBURY

Fig. VII-32 Continued

DEVELOPMENT POTENTIAL

| PARCEL | AREA (SQ.FT.) | MIXED USE | ALTERNATE | HOUSING 1-4 FAMILY (D.U.) | HOUSING MULTI FAMILY (D.U.) | HOTEL/MOTEL (ROOMS) | RETAIL AND SERVICE RETAIL (SF BLDG AREA) | AUTO-ORIENTED COMMERCIAL (SF LAND AREA) | OFFICE (SF BLDG. AREA) | MANUFACTURING (SF BLDG.AREA) | INSTITUTIONAL (SF LAND AREA) | OPEN SPACE (SF LAND AREA) | COMMUNITY FACILITY (VARIOUS UNITS) | SELL TO ABUTTORS (SF LAND AREA) | RESELL AS IS (VARIOUS UNITS) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 26 + 26X | 269,000 | | | | | | | | | | 269,000 | o | | | |
| 27 | 27,000 | | | | | | | | | | | 27,000 | | | |
| 28 | 120,500 | | | | | | | | | | 120,500 | o | | | |
| 29 | 15,000 | | | | | | | | | | | 15,000 | | | |
| 30 | 40,500 | | | | | | | | | | 40,500 | o | | | |
| 31 | 25,000 | | | | | | | | | 12,500 | | | | | |
| 32 | 58,000 | | | | | | | | | | 58,000 | o | | | |
| 33 | -- | | | | | | | | | | | | | | |
| 34 | 125,000 | | | | | | | | | | | | | | |
| 34X | 223;500 | | | | | | | | | | | | | | |
| 34 + 34X | 348,500 | x | (6) | | 200 | | 75,000 | | | | | o | oo | | |
| 35 | -- | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| TOTALS | | | | | 200 | 300 | 175,000 | | 150,000 | 52,500 | 851,000 | 248,500 | | | |

ALT. # FH-2b | NEIGHBORHOOD ROXBURY

Fig. VII-33

# DEVELOPMENT POTENTIAL

| PARCEL | AREA (SQ.FT.) | MIXED USE | ALTERNATE | HOUSING 1-4 FAMILY (D.U.) | HOUSING MULTI FAMILY (D.U.) | HOTEL/MOTEL (ROOMS) | RETAIL AND SERVICE RETAIL (SF BLDG AREA) | AUTO-ORIENTED COMMERCIAL (SF LAND AREA) | OFFICE (SF BLDG. AREA) | MANUFACTURING (SF BLDG.AREA) | INSTITUTIONAL (SF LAND AREA) | OPEN SPACE (SF LAND AREA) | COMMUNITY FACILITY (VARIOUS UNITS) | SELL TO ABUTTORS (SF LAND AREA) | RESELL AS IS (VARIOUS UNITS) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NOTE: ALTERNATIVE FH-2b IS INDENTICAL TO ALTERNATIVE FH-2 THROUGH PARCEL 32 | | | | | | | | | | | | | | |
| 33 | -- | | | | | | | | | | | | | | |
| 34 | 54,500 | | | | | | | | | | | | | | |
| 34X | 223,500 | | | | | | | | | | | | | | |
| 34 + 34X | 278,000 | x | (6) | | 200 | | 75,000 | | | | | o | oo | | |
| 35 | 62,000 | | | | | | 25,000 | | | | | o | oo | | |
| TOTALS | | | | | 200 | 300 | 200,000 | | 150,000 | 52,500 | 851,000 | 248,500 | | | |

ALT. # FH-2c | NEIGHBORHOOD ROXBURY

Fig. VII-34

# DEVELOPMENT POTENTIAL

| PARCEL | AREA (SQ.FT.) | MIXED USE | ALTERNATE | HOUSING 1-4 FAMILY (D.U.) | HOUSING MULTI FAMILY (D.U.) | HOTEL/MOTEL (ROOMS) | RETAIL AND SERVICE RETAIL (SF BLDG AREA) | AUTO-ORIENTED COMMERCIAL (SF LAND AREA) | OFFICE (SF BLDG. AREA) | MANUFACTURING (SF BLDG.AREA) | INSTITUTIONAL (SF LAND AREA) | OPEN SPACE (SF LAND AREA) | COMMUNITY FACILITY (VARIOUS UNITS) | SELL TO ABUTTORS (SF LAND AREA) | RESELL AS IS (VARIOUS UNITS) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NOTE: ALTERNATIVE FH-2c IS IDENTICAL TO ALTERNATIVE FH-2 THROUGH PARCEL 32 | | | | | | | | | | | | | | |
| 33 | 21,500 | | | | | | | | | | | 21,500 | | | |
| 34 | 117,500 | | | | | | | | | | | | | | |
| 34X | 223,500 | | | | | | | | | | | | | | |
| 34 + 34X | 341,000 | x | (6) | | 200 | | 75,000 | | | | | o | oo | | |
| 35 | 23,000 | | | | | | | | | | | 23,000 | | | |
| TOTALS | | | | | 200 | 300 | 175,000 | | 150,000 | 52,500 | 851,000 | 293,000 | | | |

ALT. # FH-3 | NEIGHBORHOOD ROXBURY | Fig. VII-35

# DEVELOPMENT POTENTIAL

| PARCEL | AREA (SQ.FT.) | MIXED USE | ALTERNATE | HOUSING 1-4 FAMILY (D.U.) | HOUSING MULTI FAMILY (D.U.) | HOTEL/MOTEL (ROOMS) | RETAIL AND SERVICE RETAIL (SF BLDG AREA) | AUTO-ORIENTED COMMERCIAL (SF LAND AREA) | OFFICE (SF BLDG. AREA) | MANUFACTURING (SF BLDG.AREA) | INSTITUTIONAL (SF LAND AREA) | OPEN SPACE (SF LAND AREA) | COMMUNITY FACILITY (VARIOUS UNITS) | SELL TO ABUTTORS (SF LAND AREA) | RESELL AS IS (VARIOUS UNITS) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 16 | -- | | | | | | | | | | | | | | |
| 17 | 56,000 | | | | | | | | | | | 56,000 | | | |
| 17X | 191,000 | | | | | | | | | | | o | | | |
| 18 | 131,500 | x | (1) | | | 300 | 15,000 | | (1) | | (1) | o | oo | | |
| 18a | 15,000 | | | | | | | | | | | 15,000 | | | |
| 18b | 122,000 | x | (2) | | (2) | | 60,000 | | (2) | | | o | oo | | |
| 19 | 26,000 | | | | | | | | | | | 26,000 | | | |
| 20 | 73,500 | | | | | | 25,000 | | | | | o | oo | | |
| 21 | 29,000 | | | | | | | | | | | 29,000 | | | |
| 22 | 172,500 | | | | | | | 172,500 | | | | o | | | |
| 22a | 33,000 | | | | | | | 33,000 | | | | | | | |
| 22b | 70,000 | | | | | | | | | | 70,000 | o | | | |
| 23 | 7,000 | | | | | | | | | | | 7,000 | | | |
| 24 | 107,500 | | | | | | | | | | 107,500 | o | | | |
| 25 | 13,000 | | | | | | | | | | | | | | |
| 25X | 66,000 | | | | | | | | | | | | | | |
| 25 + 25X | 79,000 | | | | | | | | | 40,000 | | | | | |
| 25a | 4,500 | | | | | | | | | | | | | | |
| 26 | 98,000 | | | | | | | | | | | | | | |

ALT. # FH-3 | NEIGHBORHOOD ROXBURY

Fig. VII-35 Continued

DEVELOPMENT POTENTIAL

| PARCEL | AREA (SQ.FT.) | MIXED USE | ALTERNATE | HOUSING 1-4 FAMILY (D.U.) | HOUSING MULTI FAMILY (D.U.) | HOTEL/MOTEL (ROOMS) | RETAIL AND SERVICE RETAIL (SF BLDG AREA) | AUTO-ORIENTED COMMERCIAL (SF LAND AREA) | OFFICE (SF BLDG. AREA) | MANUFACTURING (SF BLDG.AREA) | INSTITUTIONAL (SF LAND AREA) | OPEN SPACE (SF LAND AREA) | COMMUNITY FACILITY (VARIOUS UNITS) | SELL TO ABUTTORS (SF LAND AREA) | RESELL AS IS (VARIOUS UNITS) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 26X | 102,000 | | | | | | | | | | | | | | |
| 26 + 26X | 200,000 | | | | | | | | | | 200,000 | o | | | |
| 27 | 206,000 | x | (5) | | | | | 206,000 | | (5) | (5) | o | | | |
| 28 | 109,000 | | | | | | | | | | 109,000 | o | | | |
| 29 | 48,000 | | | | | | | | | | | 48,000 | | | |
| 30 | 40,500 | | | | | | | | | | 40,500 | o | | | |
| 31 | 25,000 | | | | | | | | | 12,500 | | | | | |
| 32 | 73,000 | | | | | | | | | | 73,000 | o | | | |
| 33 | 26,000 | | | | | | | | | | | 26,000 | | | |
| 34 | 31,500 | | | | | | | | | | | | | | |
| 34X | 223,500 | | | | | | | | | | | | | | |
| 34 + 34X | 255,000 | x | (6) | | 200 | | 75,000 | | | | | o | oo | | |
| 35 | 32,500 | | | | | | | 32,500 | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| TOTALS | | | | | 200 | 300 | 175,000 | 444,000 | | 52,500 | 600,000 | 207,000 | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |

ALT. # FH-4 | NEIGHBORHOOD ROXBURY | Fig. VII-36

DEVELOPMENT POTENTIAL

| PARCEL | AREA (SQ.FT.) | MIXED USE | ALTERNATE | HOUSING 1-4 FAMILY (D.U.) | HOUSING MULTI FAMILY (D.U.) | HOTEL/MOTEL (ROOMS) | RETAIL AND SERVICE RETAIL (SF BLDG AREA) | AUTO-ORIENTED COMMERCIAL (SF LAND AREA) | OFFICE (SF BLDG. AREA) | MANUFACTURING (SF BLDG.AREA) | INSTITUTIONAL (SF LAND AREA) | OPEN SPACE (SF LAND AREA) | COMMUNITY FACILITY (VARIOUS UNITS) | SELL TO ABUTTORS (SF LAND AREA) | RESELL AS IS (VARIOUS UNITS) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 16 | 29,000 | | | | | | | | | | | | | | |
| 16X | 54,000 | | | | | | | | | | | | | | |
| 16 + 16X | 83,000 | | | | | | | | | | | 83,000 | oo | | |
| 17 | 56,000 | | | | | | | | | | | 56,000 | | | |
| 17X | 191,000 | | | | | | | | | | | o | | | |
| 18 | 255,000 | x | (7) | | | 300 | 75,000 | | 150,000 | | (7) | o | oo | | |
| 18a | 15,000 | | | | | | | | | | | 15,000 | | | |
| 19 | 26,000 | | | | | | | | | | | 26,000 | | | |
| 20 | 92,000 | | | | | | 25,000 | | | | | o | | | |
| 21 | 18,500 | | | | | | | | | | | 18,500 | | | |
| 22 | 297,000 | | | | | | | | | | 297,000 | o | | | |
| 23 | 8,000 | | | | | | | | | | | 8,000 | | | |
| 24 | 66,000 | | | | | | | | | | 66,000 | o | | | |
| 25 | 13,000 | | | | | | | | | | | | | | |
| 25X | 66,000 | | | | | | | | | | | | | | |
| 25 + 25X | 79,000 | | | | | | | | | 40,000 | | | | | |
| 25a | 4,500 | | | | | | | | | | | | | | |
| 26 | 167,000 | | | | | | | | | | | | | | |
| 26X | 102,000 | | | | | | | | | | | | | | |

ALT. # FH-4 | NEIGHBORHOOD ROXBURY | Fig. VII-36 Continued

# DEVELOPMENT POTENTIAL

| PARCEL | AREA (SQ.FT.) | MIXED USE | ALTERNATE | HOUSING 1-4 FAMILY (D.U.) | HOUSING MULTI FAMILY (D.U.) | HOTEL/MOTEL (ROOMS) | RETAIL AND SERVICE RETAIL (SF BLDG AREA) | AUTO-ORIENTED COMMERCIAL (SF LAND AREA) | OFFICE (SF BLDG. AREA) | MANUFACTURING (SF BLDG.AREA) | INSTITUTIONAL (SF LAND AREA) | OPEN SPACE (SF LAND AREA) | COMMUNITY FACILITY (VARIOUS UNITS) | SELL TO ABUTTORS (SF LAND AREA) | RESELL AS IS (VARIOUS UNITS) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 26 + 26X | 269,000 | | | | | | | | | | 269,000 | o | | | |
| 27 | 27,000 | | | | | | | | | | | 27,000 | | | |
| 28 | 120,500 | | | | | | | | | | 120,500 | o | | | |
| 29 | 15,000 | | | | | | | | | | | 15,000 | | | |
| 30 | 40,500 | | | | | | | | | | 40,500 | o | | | |
| 31 | 25,000 | | | | | | | | | 12,500 | | | | | |
| 32 | 58,000 | | | | | | | | | | 58,000 | o | | | |
| 33 | 17,500 | | | | | | | | | | | 17,500 | | | |
| 34 | 125,000 | | | | | | | | | | | | | | |
| 34X | 223,500 | | | | | | | | | | | | | | |
| 34 + 34X | 348,500 | x | (6) | | 200 | | 75,000 | | | | | o | oo | | |
| 35 | -- | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| TOTALS | | | | | 200 | 300 | 175,000 | | 150,000 | 52,500 | 851,000 | 266,000 | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |

ALT. # FH-4a | NEIGHBORHOOD ROXBURY | Fig. VII-37

# DEVELOPMENT POTENTIAL

| PARCEL | AREA (SQ.FT.) | MIXED USE | ALTERNATE | HOUSING 1-4 FAMILY (D.U.) | HOUSING MULTI FAMILY (D.U.) | HOTEL/MOTEL (ROOMS) | RETAIL AND SERVICE RETAIL (SF BLDG AREA) | AUTO-ORIENTED COMMERCIAL (SF LAND AREA) | OFFICE (SF BLDG. AREA) | MANUFACTURING (SF BLDG.AREA) | INSTITUTIONAL (SF LAND AREA) | OPEN SPACE (SF LAND AREA) | COMMUNITY FACILITY (VARIOUS UNITS) | SELL TO ABUTTORS (SF LAND AREA) | RESELL AS IS (VARIOUS UNITS) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NOTE: | ALTERNATIVE FH-4a IS INDENTICAL TO ALTERNATIVE FH-4 THROUGH PARCEL 32 | | | | | | | | | | | | | |
| 33 | -- | | | | | | | | | | | | | | |
| 34 | 54,500 | | | | | | | | | | | | | | |
| 34X | 223,500 | | | | | | | | | | | | | | |
| 34 + 34X | 288,000 | x | (6) | | 200 | | 75,000 | | | | | o | oo | | |
| 35 | -- | | | | | | | | | | | | | | |
| TOTALS | | | | | 200 | 300 | 175,000 | | 150,000 | 52,500 | 851,000 | 266,000 | | | |

ALT. # FH- 4b | NEIGHBORHOOD ROXBURY | Fig. VII-38

# DEVELOPMENT POTENTIAL

| PARCEL | AREA (SQ.FT.) | MIXED USE | ALTERNATE | HOUSING 1-4 FAMILY (D.U.) | HOUSING MULTI FAMILY (D.U.) | HOTEL/MOTEL (ROOMS) | RETAIL AND SERVICE RETAIL (SF BLDG AREA) | AUTO-ORIENTED COMMERCIAL (SF LAND AREA) | OFFICE (SF BLDG. AREA) | MANUFACTURING (SF BLDG.AREA) | INSTITUTIONAL (SF LAND AREA) | OPEN SPACE (SF LAND AREA) | COMMUNITY FACILITY (VARIOUS UNITS) | SELL TO ABUTTORS (SF LAND AREA) | RESELL AS IS (VARIOUS UNITS) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NOTE: ALTERNATIVE FH-4b IS IDENTICAL TO ALTERNATIVE FH-4 THROUGH PARCEL 32 | | | | | | | | | | | | | | |
| 33 | 21,500 | | | | | | | | | | | 21,500 | | | |
| 34 | 117,500 | | | | | | | | | | | | | | |
| 34X | 223,500 | | | | | | | | | | | | | | |
| 34 + 34X | 341,000 | x | (6) | | 200 | | 75,000 | | | | | o | oo | | |
| 35 | 23,000 | | | | | | | | | | | 23,000 | | | |
| TOTALS | | | | | 200 | 300 | 175,000 | | 150,000 | 52,500 | 851,000 | 310,000 | | | |

ALT. # FH-5 | NEIGHBORHOOD ROXBURY | Fig. VII-39

# DEVELOPMENT POTENTIAL

| PARCEL | AREA (SQ.FT.) | MIXED USE | ALTERNATE | HOUSING 1-4 FAMILY (D.U.) | HOUSING MULTI FAMILY (D.U.) | HOTEL/MOTEL (ROOMS) | RETAIL AND SERVICE RETAIL (SF BLDG AREA) | AUTO-ORIENTED COMMERCIAL (SF LAND AREA) | OFFICE (SF BLDG. AREA) | MANUFACTURING (SF BLDG.AREA) | INSTITUTIONAL (SF LAND AREA) | OPEN SPACE (SF LAND AREA) | COMMUNITY FACILITY (VARIOUS UNITS) | SELL TO ABUTTORS (SF LAND AREA) | RESELL AS IS (VARIOUS UNITS) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 16 | 29,000 | | | | | | | | | | | | | | |
| 16x | 54,000 | | | | | | | | | | | | | | |
| 16+16x | 83,000 | | | | | | | | | | | 83,000 | 00 | | |
| 17 | 56,000 | | | | | | | | | | | 56,000 | | | |
| 17x | 191,000 | | | | | | | | | | | 0 | | | |
| 18 | 255,000 | x | (7) | | (7) | 300 | 75,000 | | 150,000 | | (7) | 0 | 00 | | |
| 18a | 15,000 | | | | | | | | | | | 15,000 | | | |
| 19 | 33,000 | | | | | | | | | | | 33,000 | | | |
| 20 | 105,000 | x | (3) | | | | 25,000 | | | | | 0 | 00 | | |
| 21 | 12,000 | | | | | | | | | (8) | | | | | |
| 22 | 267,000 | | | | | | | | | | 267,000 | 0 | | | |
| 23 | 3,000 | | | | | | | | | | | 3,000 | | | |
| 24 | 54,500 | | | | | | | | | | 54,500 | 0 | | | |
| 25 | 83,500 | | (4) | | | | | | | 40,000 | | 0 | (4) | | |
| 25a | 10,000 | | | | | | | | | 5,000 | | | | | |
| 26 | 141,000 | | | | | | | | | | | | | | |
| 26x | 102,000 | | | | | | | | | | | | | | |
| 26+26x | 243,000 | | | | | | | | | | 243,000 | 0 | | | |
| 27 | 8,000 | | | | | | | | | | | 8,000 | | | |

ALT. # FH-5 | NEIGHBORHOOD ROXBURY

Fig. VII-39 (Continued) DEVELOPMENT POTENTIAL

| PARCEL | AREA (SQ.FT.) | MIXED USE | ALTERNATE | HOUSING 1-4 FAMILY (D.U.) | HOUSING MULTI FAMILY (D.U.) | HOTEL/MOTEL (ROOMS) | RETAIL AND SERVICE RETAIL (SF BLDG AREA) | AUTO-ORIENTED COMMERCIAL (SF LAND AREA) | OFFICE (SF BLDG. AREA) | MANUFACTURING (SF BLDG.AREA) | INSTITUTIONAL (SF LAND AREA) | OPEN SPACE (SF LAND AREA) | COMMUNITY FACILITY (VARIOUS UNITS) | SELL TO ABUTTORS (SF LAND AREA) | RESELL AS IS (VARIOUS UNITS) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 27a | 59,000 | | | | | | 10,000 | | | (8) | | | | | |
| 27b | 29,000 | | | | | | | | | 14,000 | | | | | |
| 28 | 114,000 | | | | | | | | | | 114,000 | 0 | | | |
| 29 | 6,000 | | | | | | | | | | | 6,000 | | | |
| 30 | 36,000 | | | | | | | | | | 36,000 | 0 | | | |
| 31 | 40,000 | | | | | | | | | 20,000 | | | | | |
| 32 | 38,000 | | | | | | | | | | 38,000 | 0 | | | |
| 32a | 7,000 | | | | | | | | | | | 0 | | 7,000 | |
| 33 | -- | | | | | | | | | | | | | | |
| 34 | 119,000 | | | | | | | | | | | | | | |
| 34x | 219,000 | | | | | | | | | | | | | | |
| 34+34x | 338,000 | x | (6) | | 200 | | 75,000 | | | | | 0 | 00 | | |
| 35 | -- | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| TOTALS | | | | | 200 | 300 | 185,000 | | 150,000 | 79,000 | 752,500 | 204,000 | | 7,000 | |

ALT. # FH-6 | NEIGHBORHOOD ROXBURY | Fig. VII-40

# DEVELOPMENT POTENTIAL

| PARCEL | AREA (SQ.FT.) | MIXED USE | ALTERNATE | HOUSING 1-4 FAMILY (D.U.) | HOUSING MULTI FAMILY (D.U.) | HOTEL/MOTEL (ROOMS) | RETAIL AND SERVICE RETAIL (SF BLDG AREA) | AUTO-ORIENTED COMMERCIAL (SF LAND AREA) | OFFICE (SF BLDG. AREA) | MANUFACTURING (SF BLDG.AREA) | INSTITUTIONAL (SF LAND AREA) | OPEN SPACE (SF LAND AREA) | COMMUNITY FACILITY (VARIOUS UNITS) | SELL TO ABUTTORS (SF LAND AREA) | RESELL AS IS (VARIOUS UNITS) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | NOTE: ALTERNATIVE FH-6 IS IDENTICAL TO ALTERNATIVE FH-5 THROUGH PARCEL 32A | | | | | | | | | | | | | | |
| 33 | -- | | | | | | | | | | | | | | |
| 34 | 46,000 | | | | | | | | | | | | | | |
| 34x | 219,000 | | | | | | | | | | | | | | |
| 34+34x | 265,000 | x | (6) | | 200 | | 75,000 | | | | | 0 | 00 | | |
| 35 | 73,000 | | | | | | 25,000 | | | | | 0 | 00 | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| TOTALS | | | | | 200 | 300 | 210,000 | | 150,000 | 79,000 | 752,500 | 204,000 | | 7,000 | |

ALT. # FH-6a | NEIGHBORHOOD ROXBURY | Fiq. VII-41

DEVELOPMENT POTENTIAL

| PARCEL | AREA (SQ.FT.) | MIXED USE | ALTERNATE | HOUSING 1-4 FAMILY (D.U.) | HOUSING MULTI FAMILY (D.U.) | HOTEL/MOTEL (ROOMS) | RETAIL AND SERVICE RETAIL (SF BLDG AREA) | AUTO-ORIENTED COMMERCIAL (SF LAND AREA) | OFFICE (SF BLDG. AREA) | MANUFACTURING (SF BLDG.AREA) | INSTITUTIONAL (SF LAND AREA) | OPEN SPACE (SF LAND AREA) | COMMUNITY FACILITY (VARIOUS UNITS) | SELL TO ABUTTORS (SF LAND AREA) | RESELL AS IS (VARIOUS UNITS) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

NOTE: ALTERNATIVE FH-6A CONTAINS PARCELS THAT ARE IDENTICAL TO ALTERNATIVE FH-5 (FIG. VII-39)

THE ARTERIAL STREET IN ALTERNATIVE FH-6A TERMINATES AT JACKSON SQUARE PERPENDICULAR TO CENTRE STREET.

## DEVELOPMENT POTENTIAL SOUTH END FIGURE VII-42 TO VII-44

Fig. VII-42

# DEVELOPMENT POTENTIAL

| ALTERNATIVES | HOUSING 1-4 FAMILY (D.U.) | HOUSING MULTI FAMILY (D.U.) | HOTEL/MOTEL (ROOMS) | RETAIL AND SERVICE RETAIL (SF BLDG AREA) | AUTO-ORIENTED COMMERCIAL (SF LAND AREA) | OFFICE (SF BLDG. AREA) | MANUFACTURING (SF BLDG.AREA) | INSTITUTIONAL (SF LAND AREA) | OPEN SPACE (SF LAND AREA) | COMMUNITY FACILITY (VARIOUS UNITS) | SELL TO ABUTTORS (SF LAND AREA) | RESELL AS IS (VARIOUS UNITS) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SC-1 | | 21 | | 62,500 | | 180,000 | | | 4,100 | | | |
| SC-2 | | 9 | | 58,500 | | 180,000 | | | | | | |

NOTE: (1) PARCELS 1 AND 2 ARE PROPOSED FOR JOINT DEVELOPMENT WITH MASSACHUSETTS AVENUE STATION HAVING GROUND FLOOR RETAIL AND SMALL OFFICES ABOVE; HOUSING MAY BE AN ALTERNATE USE.

EXPLANATION OF NOTES AND SYMBOLS:

0 INDICATES DEDICATION OF A PORTION OF THE PARCEL FOR OPEN SPACE USE TO ACCOMMODATE SUCH USES AS THE REGIONAL TRAIL, BIKE PATH, AND A "GREEN-BELT" CONCEPT.

00 INDICATES THE POSSIBILITY OF PROVIDING A COMMUNITY FACILITY AS PART OF THE PROPOSED DEVELOPMENT. THIS FACILITY COULD TAKE MANY FORMS, SUCH AS A HEALTH CENTER, COMMUNITY CENTER, A RECREATIONAL FACILITY, ETC.

ALT. # SC-1 | NEIGHBORHOOD SOUTH END | Fig. VII-43

# DEVELOPMENT POTENTIAL

| PARCEL | AREA (SQ.FT.) | MIXED USE | ALTERNATE | HOUSING 1-4 FAMILY (D.U.) | HOUSING MULTI FAMILY (D.U.) | HOTEL/MOTEL (ROOMS) | RETAIL AND SERVICE RETAIL (SF BLDG AREA) | AUTO-ORIENTED COMMERCIAL (SF LAND AREA) | OFFICE (SF BLDG. AREA) | MANUFACTURING (SF BLDG.AREA) | INSTITUTIONAL (SF LAND AREA) | OPEN SPACE (SF LAND AREA) | COMMUNITY FACILITY (VARIOUS UNITS) | SELL TO ABUTTORS (SF LAND AREA) | RESELL AS IS (VARIOUS UNITS) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3,000 | x | (1) | | | | 10,000 | | 10,000 | | | 0 | 00 | | |
| 2 | 7,600 | x | (1) | | | | 20,000 | | 20,000 | | | 0 | 00 | | |
| 3 | 3,500 | x | | | 9 | | 3,500 | | | | | 0 | | | |
| 4 | 2,100 | | | | | | | | | | | 2,100 | | x | |
| 5 | 2,000 | | | | | | | | | | | 2,000 | | x | |
| 6 | 4,000 | x | | | 12 | | 4,000 | | | | | 0 | | | |
| 7 | 900 | | | | | | | | | | | 0 | | x | |
| Bak Bay Station | | x | | | | | 25,000 | | 150,000 | | | 0 | 00 | | |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| TOTALS | | | | | 21 | | 62,500 | | 180,000 | | | 4,100 | | | |

ALT. # SC-2 | NEIGHBORHOOD SOUTH END | Fig. VII-44

# DEVELOPMENT POTENTIAL

| PARCEL | AREA (SQ.FT.) | MIXED USE | ALTERNATE | HOUSING 1-4 FAMILY (D.U.) | HOUSING MULTI FAMILY (D.U.) | HOTEL/MOTEL (ROOMS) | RETAIL AND SERVICE RETAIL (SF BLDG AREA) | AUTO-ORIENTED COMMERCIAL (SF LAND AREA) | OFFICE (SF BLDG. AREA) | MANUFACTURING (SF BLDG.AREA) | INSTITUTIONAL (SF LAND AREA) | OPEN SPACE (SF LAND AREA) | COMMUNITY FACILITY (VARIOUS UNITS) | SELL TO ABUTTORS (SF LAND AREA) | RESELL AS IS (VARIOUS UNITS) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 3,000 | x | (1) | | | | 10,000 | | 10,000 | | | 0 | 00 | | |
| 2 | 7,600 | x | (1) | | | | 20,000 | | 20,000 | | | 0 | 00 | | |
| 3 | 3,500 | x | | | 9 | | 3,500 | | | | | 0 | | | |
| Back Bay Station | | | | | | | 25,000 | | 150,000 | | | 0 | 00 | | |
| TOTALS | | | | | 9 | | 58,500 | | 180,000 | | | | | | |

## 7.5 Flexibility for Future Transit Services

The extension of the relocated Orange Line to Forest Hills represents a step which permits many future alternatives for transit service. Design of the facility in all alternatives would allow for the immediate extension of new service on the Needham Branch. An environmental Impact Analysis for that facility is underway. To determine its mode - whether rapid transit or upgraded commuter rail. A further extension of rapid transit toward Canton is also possible with the designs under consideration. The Canton extension is much more tentative, however, and is therefore presently included in the Forest Hills-Downtown improvements as a commuter rail facility.

The removal of the Washington Street El is anticipated as part of this project. The decision for the long-range service in the alignment of the present elevated structure is intended to be the subject of far-reaching review by other studies. The alternatives being studied for that service would not include the Orange Line, and is directed toward either light rail service or bus replacement, incorporating transit lanes where possible.

The proposed circumferential transit service would cross the alignment of the relocated Orange Line at Ruggles Street. At the present time, the mode of service for the circumferential line is undetermined. If bus, it would serve the new Ruggles Street Station along with other surface bus lines or in an exclusive right-of-way tunnel. If a rail option is chosen, it is probable that the new line would be in a tunnel under the relocated Orange Line, with connections for patrons by stairs and escalators into the Ruggles Street Station. The station design at Ruggles Street allows for these options.

## 7.6 Regional Path and Open Space System

The Relocated Orange Line, along with joint land development, provides an opportunity for simultaneous development of transportation facilities and adjacent vacant lands to result in major long term benefits to the region.

There has been concern throughout this analysis for the preservation and enhancement of public open spaces and other natural and man made resources which would be affected by transportation improvements in the Southwest Corridor. The short term impacts on such resources (in terms of land takings and other direct impacts) and the means by which future transportation and land development in the Corridor can lead to an increase in the quality of the environment in each neighborhood are important aspects of this project.

A fundamental element in the Southwest Corridor transit/rail and street project is the creation of a linear park path and open space system. The configuration of such a "Green Belt" could provide access to many existing and proposed recreational facilities in the Boston Region, and would encourage pedestrian and bicycle travel throughout the Corridor and adjacent neighborhoods.

On land abutting the railroad and transit right-of-way, a linear park system, supplementing existing regional trails, could run from Forest Hills to the Back Bay Station and Copley Square. In the land to either side of the Corridor, carefully selected lateral connector paths could connect historic and cultural resources of existing neighborhoods as well as provide safe efficient access to transit stations, community facilities and neighborhood parks and playgrounds. (Fig. A-14).

By coordinating the design of a regional path network with the City of Boston, the Bureau of Environmental Management, and/or the Metropolitan District Commission, a major opportunity to articulate and reinforce the unique characteristics of the communities through which the Corridor passes is acheivable. The overall open space pattern could provide a variety of experiences, active and passive, to serve local neighborhoods and the City as a whole. The proposed linear park network could provide a neighborhood collector system to serve the transit stations, permit a convenient and pleasant trip to the transit station, and include sufficient bicycle storage facilities encouraging the use of a bike through a portion of the trip to the transit facility. A regional path could provide an alternative to the negative impacts of noise and air pollution that often accompany pedestrian traffic on ordinary streets. The opportunity for controlled and limited automobile interface would greatly increase pedestrian and bicycle safety.

The regional pedestrian path would extend as a continuous green belt from Forest Hills north to Ruggles Street and Carter Playground varying in width to a minimum of 30 feet. The path will be suitably landscaped and paved to permit bicycle and pedestrian travel and to accommodate a variety of recreational pursuits from cross country skiing to community gardening. (Fig. A-16).

At Forest Hills the transit options significantly improve the visual and physical connectivity between the Arnold Arboretum and Franklin Park. This improved linkage can be substantially reinforced and articulated via an intensely landscaped pedestrian and bicycle path designed as part of a comprehensive path and open space system throughout the Corridor. (Fig. A-15).

Between Jackson Square and Ruggles Street in the Roxbury segment of the Corridor the opportunity exists to expand open space and recreation facilities in coordination with the path system through the use of decking and existing cleared land. A lateral pedestrian connector utilizing cleared land holdings could connect the regional path at Ruggles Street to the Fenway at the Museum of Fine Arts and provide safe and efficient pedestrian and bicycle access to Wentworth Institute, Northeastern University and other Fenway institutions.

The Carter Playground area is to be developed in coordination with the New Carter School. Necessary pedestrian bridges, paths, and easements could be acquired to permit safe and efficient passage to the Arena and the proposed Massachusetts Avenue transit station as well as all paths leading to and from the Playground. Direct access from the Massachusetts Avenue station to the Arena is being examined. At Massachusetts Avenue, there exists the potential for a lateral pedestrian connector to the Christian Science Center and in the opposite direction the growing City Hospital Complex. Intensive urban design and pedestrian amenities coordinated with the City of Boston would provide an attractive means to link these facilities of regional importance with the Corridor Path network.

In the South End a landscaped network of pedestrian oriented walkways, pocket parks and bridges utilizing Claremont and Carelton Streets which abut the Corridor, could provide access by means of the proposed Darmouth Street Mall to Copley Square, Commonwealth Avenue, the Explanade and the Commons. This network would be closely coordinated with ongoing plans for the reconstruction of Columbus Avenue and the Downtown bikeways and Freedom Trails system.

Critical to the development of a regional path and open space Green Belt system with a long term positive impact for the City and the Region, is a coordinated planning effort at every funding and operating agency level; Federal, State and Local. Careful design considerations for existing and proposed open space and community facility development as an element in the Southwest Corridor transportation planning will insure the project's contribution to the environmental quality of the region.

# SOUTHWEST CORRIDOR TRANSPORTATION IMPROVEMENTS

## ENVIRONMENTAL IMPACT ANALYSIS

MASSACHUSETTS BAY TRANSPORTATION AUTHORITY
MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS

## OPEN SPACE PLAN

- (H) HISTORIC STRUCTURE
- (I) INSTITUTION
- (R) RECREATION FACILITY
- (C) COMMUNITY SERVICE FACILITY

- PRIMARY PATH (BICYCLES/PEDESTRIANS)
- SECONDARY LINKAGES

SCALE
NORTH
0 1200 2400 3600

FIGURE
A-14

FREDERIC R. HARRIS INC.

# SOUTHWEST CORRIDOR TRANSPORTATION IMPROVEMENTS

## ENVIRONMENTAL IMPACT ANALYSIS

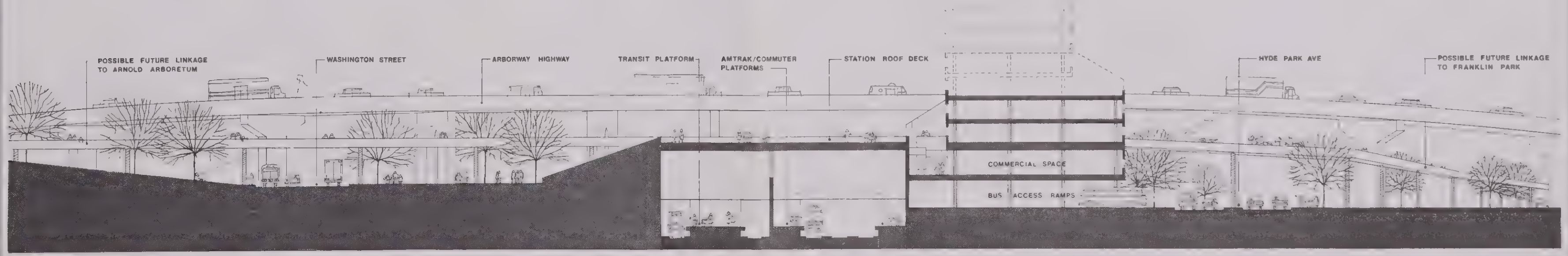
MASSACHUSETTS BAY TRANSPORTATION AUTHORITY
MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS

# FOREST HILLS STATION AREA

SECTION 4-F, 106


THE ARBORWAY (OLMSTED PARK SYSTEM)


STATION OPEN SPACE PLAN




SECTION A

NO SCALE

FIGURE A-15

FREDERIC R. HARRIS INC

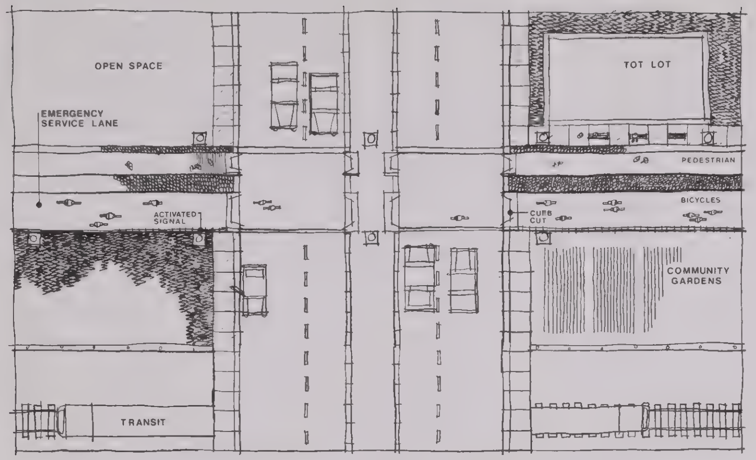
# SOUTHWEST CORRIDOR TRANSPORTATION IMPROVEMENTS

## ENVIRONMENTAL IMPACT ANALYSIS

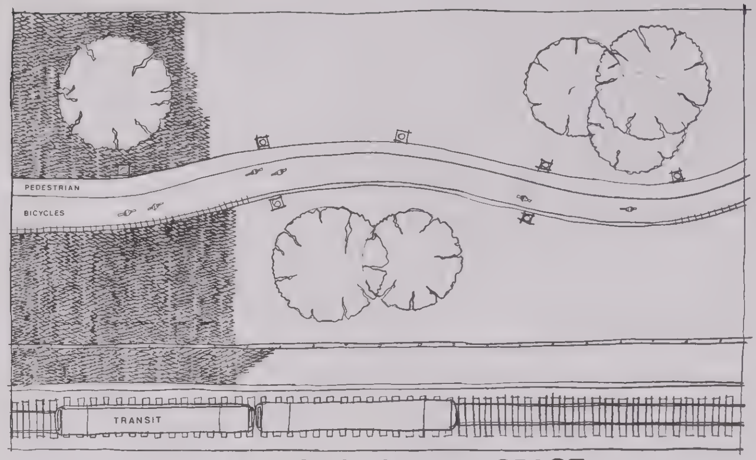
MASSACHUSETTS BAY TRANSPORTATION AUTHORITY
MASSACHUSETTS DEPARTMENT OF PUBLIC WORKS

# PROPOSED PEDESTRIAN, BICYCLE PATH

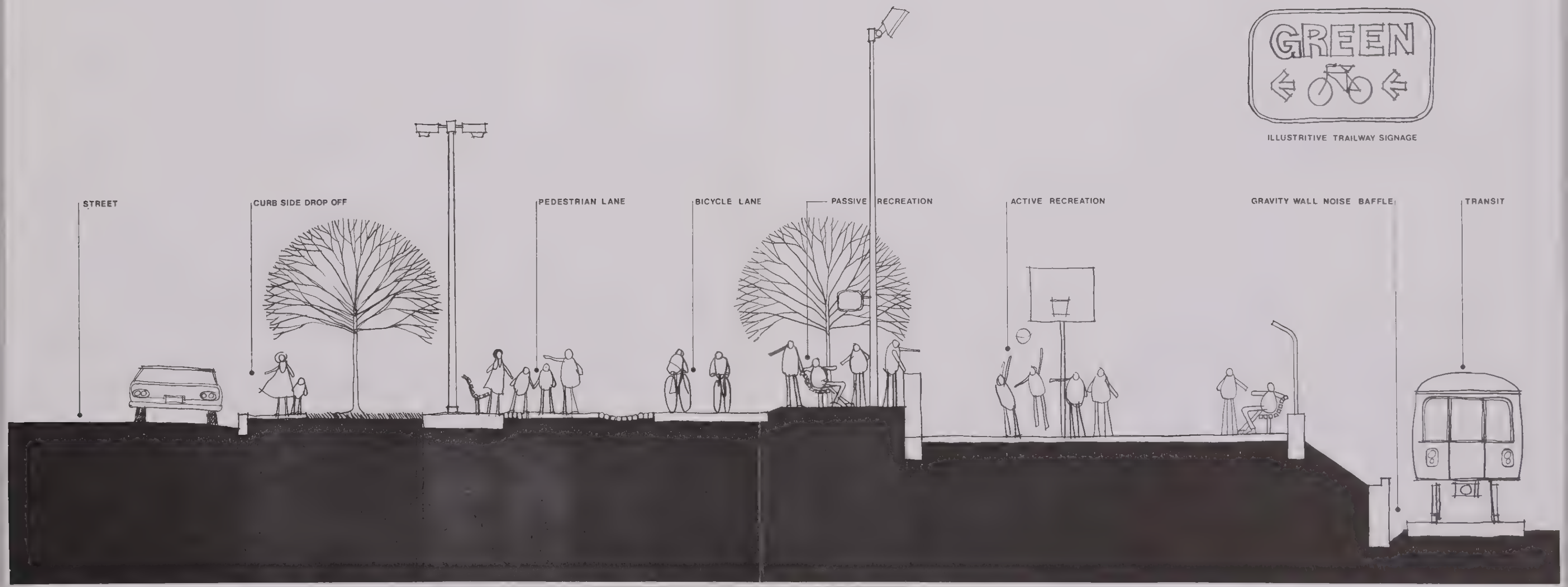
## ARCHITECTURAL DETAILS




STREET CROSSING




CONTINUOUS GREEN SPACE




NO SCALE

FIGURE A-16